

Nature-Science Series

FINDING NATURE'S TREASURES



LIBRARY OF CONGRESS



00001783129

-Gable



Class QH48

Book Q5

1933



BUDDY, MARYLEE, UNCLE JACK, FRED, AND BESS
DISCOVER NATURE'S TREASURES.

Nature-Science Series

Finding Nature's Treasures

.. by ..

Travis ELLEN (SCHULZ) QUILLIN

Director of Science and Nature Study in the
Public Schools, and Director of the
Witte Memorial Museum,
San Antonio, Texas

CHARLES H. GABLE

Teacher of Science in the Elementary School, Alamo
Heights, Texas; formerly entomologist in
the U. S. Department of Agriculture

Revision edited by Edna V. McNeil, M.A.
Teacher of Science in R. W. Emerson
Junior School, San Antonio, Texas



Illustrations by

ELIZABETH RHODES *and* JACK McGUIRE



THE SOUTHWEST PRESS

DALLAS, TEXAS

1933

QH45
.85
1933

Copyright, 1931
Revised, 1933

THE SOUTHWEST PRESS, Inc.

451514
c/mw 22. 32



unk 82-73910

PL 1001-8*

PREFACE

Birds, plants, trees, insects, soil, clouds, and stars surround us all our lives. They belong to rich and poor, to the man living in the tropics, or in the frozen north. Once our minds are opened to some of the fascinating things that science has found out about them, once we have learned to look at them with seeing eyes, during all the rest of life, they will be a source of endless delight. They become a living treasure, which time only increases, and misfortune never destroys.

Whatever studies a child may eventually pursue, no hours can be spent more profitably than learning the absorbing ways of the everyday world of Nature which surrounds him. When the habit of observation is acquired, education is assured. The purpose of this book is to arouse an intelligent curiosity about this world of Nature—to give some of its most significant and dramatic facts, some main principles which govern its being. But at the same time, it has been so conceived that turning from this book, almost without being conscious of how it has happened, the child forever after will see Nature through new and more understanding eyes. The authors have found by years of teaching and reading nature stories to children, that nothing appeals to their imagination more than the real life that blooms, flows,

flashes, creeps, and moves about them day and night. The fascination of the subject itself, the quick, vivid rewards that come with *knowing*, are a tremendous stimulus in the direction of all education.

The stories have been developed in elementary schools. Pedagogical approach and scientific accuracy have had equal consideration by the authors. They considered the children for whom they were writing as much as the subjects to be written about. It will be readily seen that they have not fully treated from a scientific standpoint all the topics introduced. They have written only the *concepts* that the child mind can easily grasp about a subject. A large museum directed by one of the authors, and the resources of Brackenridge Park in San Antonio, Texas, outstanding zoölogical and botanical garden of the South, made possible the completeness and accuracy of the book.

The illustrations were made from real life. The artists worked with the authors, so that the stories and pictures were constructed as units.

The vocabulary has been checked by the Thorndike Word List. Explanations of such scientific words as were necessary have been made in the stories when needed.

CONTENTS

	Page
Buddy, Marylee, Uncle Jack, Fred, and Bess Discover Nature's Treasures - - - -	Frontispiece
Preface - - - - -	iii
Uncle Jack Plans a Treasure Hunt - - - - -	1
Thin Wings - - - - -	5
Buddy Learns a Lesson - - - - -	7
Ants Walking with Parasols - - - - -	13
The Nest of the Parasol Ants - - - - -	16
Mr. Cricket's Queer Song - - - - -	20
The Dragon Fly - - - - -	23
Queer Water Babies - - - - -	26
A Treasure with a Horn - - - - -	29
A House of Silk - - - - -	34
Traveling Butterflies - - - - -	38
Along the Creek - - - - -	43
A Fighting Crawfish - - - - -	45
A Sunfish Guarding His Nest - - - - -	49
Tadpole to Bullfrog - - - - -	53
Wiggle-tails - - - - -	58
Little Creatures with Many Legs - - - - -	63
Giving a Spider its Dinner - - - - -	65
Marylee Finds Danger - - - - -	69
A Mother Scorpion - - - - -	72
A Hundred Pairs of Legs - - - - -	76
An Animal in a Box House - - - - -	80
A Fighting Lizard - - - - -	84

	Page
Queer Animals - - - - -	89
A Pocket Full of Babies - - - - -	91
An Adventure with a Skunk - - - - -	97
A Pet in a Shell - - - - -	101
The Champion Digger - - - - -	105
Bird's Nest or What? - - - - -	109
The Whistler - - - - -	113
A Flying Mammal - - - - -	116
Feathered Flights - - - - -	121
A Big-headed Fisherman - - - - -	123
Birds That Eat as They Fly - - - - -	127
Busy Birds - - - - -	131
A Bird That Fooled the Children - - - - -	136
A Bird That Is a Butcher - - - - -	141
A Fight in the Air - - - - -	144
Father Verdin Has His Own Nest - - - - -	149
Honk! Honk! Honk! - - - - -	152
From Seed to Tree - - - - -	155
Flowers and Their Friends - - - - -	157
Under a Live Oak Tree - - - - -	161
Buddy Fights a Weed - - - - -	165
How Seeds Travel - - - - -	169
What Is a Potato? - - - - -	172
From Sap to Sugar - - - - -	175
A Dress Made of Wood - - - - -	178
Bits of Rock and Drops of Water - - - - -	181
Dishes of Clay - - - - -	183
Stories Written on Rocks - - - - -	187
Water Floating in the Air - - - - -	190
Out in Star Land - - - - -	195
Living on the Moon - - - - -	197
Shooting Stars - - - - -	201
Finding the North Star - - - - -	204
Index - - - - -	209

*Nature never did betray,
The heart that loved her; 'tis her privilege,
Through all the years of this our life, to lead
From joy to joy.*

WILLIAM WORDSWORTH

UNCLE JACK PLANS A TREASURE HUNT

“How are all your little friends of the creek?” asked Uncle Jack, as he took a chair on the front porch after dinner. He had come to live with Buddy and Marylee. They were very happy, for they always had good times with him when he had come before on short visits. He knew so much about everything. He was ever ready to play with them and to answer their questions.

“Have you caught any snapping turtles lately, Buddy?” he asked.

“Yes, Uncle Jack, Marylee and I caught a big one not long ago,” answered Buddy. “Mother said it must have weighed twenty-five pounds. We saw it in the shallow water. I caught it by the tail, and Mother and Marylee helped me get it out on the bank. We tied a string around it and dragged it up to the house on its back. When we let it go, it turned over and went back to the creek.”

“I wish you had seen it stretch out its neck and push its head against the ground until it turned over,” said Marylee. “That neck was about a foot long. Let’s go to the creek soon; maybe we can find him again.”

“Yes, let’s do,” added Buddy, “and there are so many other things I wish you would tell me about—spiders, snakes, insects, birds, and all kinds of things.”

“Well, let’s plan a treasure hunt,” suggested Uncle



Jack. "We shall call every interesting thing we find a treasure."

"Fine!" exclaimed Buddy.

"Oh, Mother," added Marylee, "will you go with us?"

"No, I shall let Uncle Jack take my place tomorrow," said Mother. "I have been out with you so often in the last few days. Uncle Jack has come to be with us for a long time, and he knows much more than I do about the things you will find."

"Uncle Jack, may we take Fred and Bess with us?" asked Buddy. "Fred is my chum, and Bess plays with Marylee almost every day."

"Do you think we could take enough lunch for all of us?" asked Uncle Jack, smiling.

"Fred and Bess together don't eat as much as Buddy," said Marylee.

"Oh, they do, too," said Buddy. "I don't eat so much."

"Run along and ask them if they will go," interrupted Mother. "Uncle Jack was only teasing."

THIN WINGS

*And there's never a leaf nor blade too mean
To be some happy creature's palace.*

J. R. LOWELL

BUDDY LEARNS A LESSON

“Are you ready, little treasure hunters?” called Uncle Jack, as he closed the door of his automobile upon them.

“Yes,” cried the children together, as they started. They rode for some miles until they came to the woods. Then they parked the car under a tree, and all started walking. Buddy ran ahead.

“I’ve found the first treasure,” shouted Buddy.

The other children began to run toward him. They saw him pick up a long stick. He commenced to poke at something up in a tree.

“You had better be careful how you poke things,” called Uncle Jack; but Buddy did not hear him. Then they saw him drop the stick. He jumped back and began to run. He was slapping his head and face.

“Ow! Ow! Ouch! Ouch!” he cried as he ran this way and that, waving his arms.

“Run for the brush! Run for the brush!” called Uncle Jack. Into the brush he went like a rabbit. They could hear his shirt tear as it caught on a thorn. But he did not stop.

“What—what is the matter with him?” asked Bess. She was so frightened that she could hardly talk.

“Wasps are after him,” said Uncle Jack. “He punched a wasps’ nest.”

They saw Buddy stick his head out of the brush and look around. Soon he came walking on his toes as though he were afraid some one would hear him. He came to them, holding one side of his face with one hand, and rubbing the back of his ear with the other hand. Poor Buddy looked as if he wanted to cry, but he would not.

“What happened, Buddy?” Marylee asked.

“About a million wasps tried to sting me, and some of them did,” answered Buddy. “I found their nest in that tree. I thought that I would just give it a poke and see what they would do.”

“Did you find out?” asked Uncle Jack, with a twinkle in his eye.

“Yes, I did,” said Buddy. “And it was more than I wanted to know.”

“Let’s go over and see your wasps’ nest,” laughed Uncle Jack.

“You can if you want to,” replied Buddy. “But I have seen all I want to see of it.”

“Buddy, we all have to learn to be careful what we do to other people, even if they are only the little people of the fields. If a man came along with a great pole and poked into the windows of your house, what would you do?”

“I would try to make him stop.”

“Of course you would, Buddy. And so would Fred or anyone else. That is just what the wasps were doing. Don’t you see that you were breaking their house? You were even killing their babies.”



“I didn’t think of it that way, Uncle Jack. I suppose I deserved to be stung.”

“They won’t hurt you unless you first hurt them. Let’s go over now and see them.”

Uncle Jack walked slowly over to the tree. Fred, Bess, and Marylee followed him, but Buddy was last this time.

“Stand very quietly,” said Uncle Jack. “Do not move, and the wasps will not hurt you.”

The children looked into the tree, and there they saw the nest. “What a queer looking nest that is!” said Bess. “It looks like a piece of gray honeycomb hung upside down by a stem.”

"See all of those wasps hanging on the nest and looking right at us," added Fred.

"They are watching to see if we are going to do as Buddy did," said Uncle Jack. "They are ready to go on the warpath again, just as they did when they went after Buddy. Only a few kinds of insects feed and take care of their babies the way wasps do. Many insects lay their eggs in the ground or on some plant, and then forget all about them. When the babies hatch out of the eggs, they have to find their own food and look out for themselves. When little boys poke them with sticks, they do not have anyone to fight for them as the baby wasps do."

"Isn't this a part of their nest?" asked Fred, as he picked up something.

"Yes," said Uncle Jack. "Buddy has broken it off. Isn't that too bad?"

"I'm sorry," said Buddy. "But it is a queer-looking piece. What is the nest made of, Uncle Jack? The walls around the holes are as thin as paper."

"They are made of paper," he answered.

"What! Real paper like in a book?" asked Bess.

"Yes. Much of our paper is made of wood taken from trees. It is hard to believe that your book was once a part of a great tree. You will learn the story of how books are made from trees when you are older."

"But tell us now how these wasps make their paper, Uncle Jack."

"The wasp flies to an old post or log where the wood is not hard. She scrapes off some of the soft wood with her strong, sharp jaws. She chews the wood in her mouth

the way you chew gum. When it is soft, the wasp uses it to build the nest. Of course, the paper is not smooth and white like the paper in your book, but it does make the walls of the little rooms for her babies."

"Tell us about the babies," begged Bess.

"They do not look like Mother Wasp," continued Uncle Jack. "They are just fat, little, white grubs. Here is one. Look down at the bottom of this tiny open room." Uncle Jack held the piece of nest so they could see into it. "They have no legs nor wings. They do not need them, because each baby stays in its own room all of the time. The big wasps bring them food."

"What kind of food do the big wasps give them?" asked Fred.

"The old wasps feed the babies caterpillars," replied Uncle Jack. "When the old wasp finds a caterpillar, she kills it and chews it, until it is a little round ball which she can easily carry to the nest. Other wasps at the nest take part of the little ball from the one which brought it, and feed it to the babies."

"Do the babies grow very fast?" asked Marylee.

"Yes, they do," replied Uncle Jack. "When the baby grows so large that it almost fills the room, it covers the open end of the room with a kind of paper. The paper is almost like water when it comes from the baby's mouth, but it quickly turns white and strong."

"That is wonderful," declared Bess.

"The little white baby wasp," continued Uncle Jack, "which does not have either wings or legs, shuts itself up. So it gets no more food. In a few days it comes out

of the room with legs and wings and head and eyes and stinger, like all the other big wasps. I wish I could explain to you how the baby wasp does it. All I can tell you is that soon after the baby shuts itself in the room, it goes to sleep. Slowly the baby changes so that it looks more like the big wasps. But it is still white, and the legs and wings are inside its skin, so the baby wasp cannot use them."

"Since it looks so different from a baby wasp, what is it called?" asked Fred.

"I am glad you asked that question, Fred. I shall give you three new words to learn. While the baby wasp is eating and growing, we call it a *larva*. After it goes to sleep and is changing to a grown-up wasp, it becomes a *pupa*. The skin of the pupa turns darker and splits down the back after a few more days. The full-grown wasp then crawls out of the skin and cuts a hole in the end of the paper room so that it can get out. Now it is like the other wasps, and is called an *adult*."

"I am going to try to remember all that Uncle Jack has told us about wasps," said Marylee.

"I know that I will always remember not to poke a nest of theirs," declared Buddy, as he rubbed his face, which was swollen where the wasps had stung him.

ANTS WALKING WITH PARASOLS

“Here are some ants with parasols,” called Bess.

They all ran to Bess and knelt down to see the little ants. The ants had made a clean smooth path through the grass. Each one was holding in its jaws a tiny piece of green leaf. It spread over the ant’s back like a parasol.

“I wonder where they get the leaves,” said Fred. “Some of them are going the other way without any. Come on, Buddy, let’s follow their trail.”

The children followed the little ants to a bush. There they saw a queer sight. Ants were all over the bush. They were cutting off pieces of leaves with their sharp scissor-like jaws. When the piece was almost off, the ant crawled out on it.

“Look at that crazy ant,” said Marylee, pointing to one. “When the leaf falls, the ant will fall, too.”

“The ant knows what it is doing,” said Uncle Jack.

The ant took a last snip. The piece of leaf with the ant upon it floated down to the ground. Then the ant picked up the leaf and, holding it over its head and back, started off along the path.

“Well, that ant must be too lazy to crawl down to the ground,” said Buddy.

“I think that it is smart,” added Fred. “That is a quick, easy way to get down.”



The children followed the loaded ants back along the path until they came to a big pile of earth. Here the ants were going through a hole and carrying the green pieces.

“What do they do with the leaves on the inside?” asked Buddy.

“They make gardens with them,” said Uncle Jack.

“Real gardens, Uncle Jack?” asked Bess.

“Yes, they dig out a big room in the ground, big for such little creatures to make. Sometimes it is two feet long, and four or five inches from top to bottom. The ants chew the leaves until they are soft and wet. Then they cover the floor with these soft wet leaves and plant their gardens in them.”

“Do you mean they plant beets, carrots, lettuce, and cabbage?” asked Marylee.

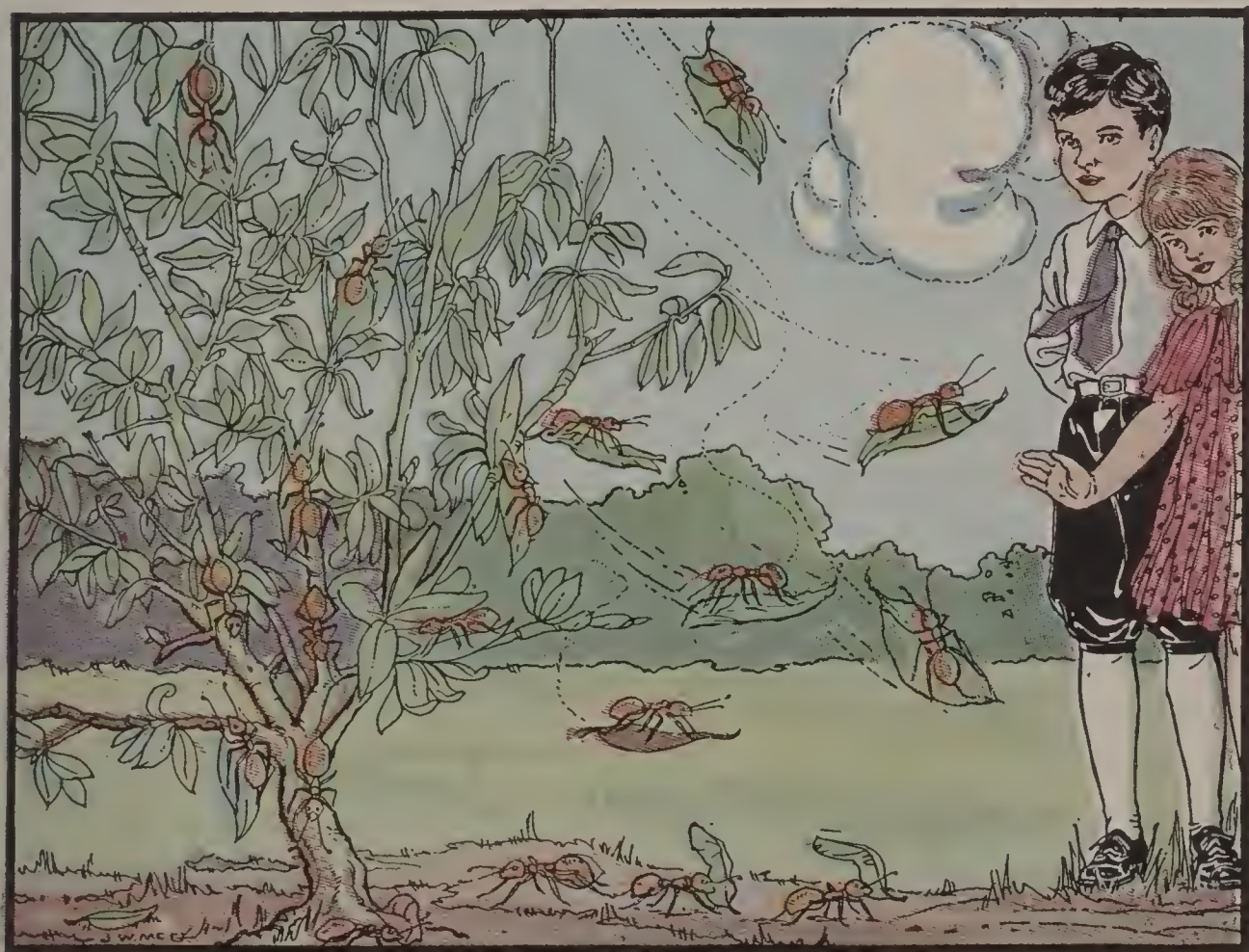
“No, no,” laughed Uncle Jack, “they plant fungus.”

"I never heard of fungus before," said Buddy.

"Do you know what moss is?" Uncle Jack asked them.

"I do," said Bess. "It is green and it grows on wet, shady ground. Sometimes it grows on the sides of trees and logs, and makes them look green."

"That is right, Bess," said Uncle Jack. "The fungus that the ants plant is very much like moss. Moss does not need the sunlight. But fungus does not need light at all. It will grow down in the dark garden rooms of the ants. The fungus plants are very much smaller than the plants of moss. The stems are white and tender. The ants eat them and feed them to their babies."



THE NEST OF THE PARASOL ANTS

“I wish we could watch the ants at work inside of their nest,” remarked Marylee, as they stood around a nest of parasol ants, and watched the little insects carry bits of green leaves down into the ground.

“It would be very interesting,” said Uncle Jack. “You would enjoy seeing the ants caring for their babies.”

“Oh, Uncle Jack, tell us about the baby ants,” begged both of the girls.

“Ants lay eggs as most of the other insects do,” began Uncle Jack. “These ants keep their eggs in special rooms where it is damp and warm enough to make the eggs hatch into tiny ants. These ant babies are then carried to another room, which we may call the nursery.”

“How do the ants carry the babies?” asked Marylee. “Do they have baskets or baby buggies?”

“I know how they carry them,” said Fred. “I lifted up a stone one day and saw the ants carry away their babies. Of course, they did not have baskets or baby buggies. They did not carry them in their arms the way people carry babies, either. They carried them in their jaws, almost the way a mother cat carries her kitten.”

“You are right, Fred,” agreed Uncle Jack. “The jaws of the large ants are very sharp, but the ants carry their babies so gently that they are not hurt. The nurse ants

feed and take care of the babies in the nursery. Who remembers what we call an insect baby while it is eating and growing?"

"I do! I do!" cried Buddy, before the others could answer. "It is called a larva. You told us that when we talked about the baby wasps."

Uncle Jack then continued, "The mother ant stays down in the nest all of the time and is very busy laying eggs. She is called the *Queen*. Each nest has one Mother Queen. The worker ants, which you see, are only as large around as the lead in your pencil, but the Queen is nearly as large as a shelled peanut. At certain times of the year a large number of king ants and queen ants hatch out in the nest. All of these young kings and queens have wings. They soon leave the old nest and fly away. Each queen flies as far as she can, then she comes down to the ground. She hunts a good place for a nest of her own. That is the only time she will ever fly. She will never need her wings again; so she breaks them off with her legs."

"Doesn't it hurt her when she does that?" asked Marylee.

"I don't think it hurts her any more than it hurts a tree when its leaves fall off in the autumn," replied Uncle Jack. "The wings are almost ready to come loose, because she is through with them. Now, if the new queen cannot find a little cave already made under a stone, she digs a round hole in the ground. When her new nest is ready for her to live in, she goes inside and fills the doorway with earth."

"Why does she fill the doorway?" Buddy asked.

"She does this so that no enemy can come in to kill her," Uncle Jack replied.

"If she fills the doorway with earth, how can she get out again?" asked Fred.

"She doesn't come out again," Uncle Jack explained. "She stays in that nest as long as she lives. She never comes outside even for a walk."

"What does she do down in that hole all by herself?" Bess wanted to know.

"The first thing she does is to lay some tiny round eggs," answered Uncle Jack. "They stick together in a bunch, so that she can pick them up and carry them in her jaws when she wishes. After the eggs hatch, she feeds and cares for the babies."

"What does she feed them and what does she, herself, eat?" demanded Fred. "You did not say that she made a fungus garden."

"She eats nothing while her first babies are growing," replied Uncle Jack. "She feeds them food from her mouth, which is almost like water. But it is good enough to keep the babies alive until they become real worker ants. These young workers dig open the doorway and start a fungus garden. The queen then has nothing to worry about. She will have plenty to eat for herself and her babies, because her children are all good workers. That is the way the queen of the parasol ants starts her new nest."

"What a wonderful story, Uncle Jack!" said Bess.

“Do you think we can find any other treasures as interesting?”

“Yes, of course you can, if you keep your eyes open,”
Uncle Jack answered.

MR. CRICKET'S QUEER SONG

Something was chirping in the grasses. "What is that?" asked Buddy.

"I know!" exclaimed Bess. "That is a cricket singing his song. I thought crickets sang only at night."

"They do most of the time," explained Uncle Jack. "Sometimes they are so happy that they come out of their houses and sing in the daytime. Perhaps you may get close enough to see how this one sings."

"Let's see if we can find him," said Fred.

"I think he is over there in that open place among the trees," Uncle Jack added. "Do you see that stone with the grass around it? I believe Mr. Cricket has his house under it. Let us walk carefully and not whisper nor make any noise."

Mr. Cricket did not hear them coming. He sang a little, then he rested a bit. At last they came very near. There they saw black Mr. Cricket standing in front of his door, a little hole under the stone. Mr. Cricket was raising his wings and rubbing the backs of them together. This made the singing noise they heard.

It was so funny to see Mr. Cricket rubbing his wings to make music that Bess forgot that she was not to make any noise. She laughed aloud. Mr. Cricket heard her



and stopped his music. He looked up and saw the children peeping at him. Then he darted into his house under the stone.

“There, you have scared him away. Girls never do keep quiet, anyway,” said Fred.

“I didn’t mean to,” said Bess. “But he did look so funny rubbing his wings to make music.”

“Mr. Cricket can’t sing any other way,” said Uncle Jack. “He can’t sing with his mouth the way you do. So he sings by moving his wings.”

“I never heard before of anything singing with its wings,” interrupted Buddy.

“Well, I’ll tell you how he does it,” continued Uncle Jack. “On the back of each wing is a rough place. When Mr. Cricket rubs the backs of his wings together, the two rough places rub against each other and make a sound. That sound is the music you hear.”

“Do you think that we could lift up the stone and catch him?”

“Yes, you could catch him, Buddy, but you would ruin his home if you did that. He worked hard to dig that hole. Just think how frightened he would be. He does not hurt anyone out here. He just eats the grass and sings happily. Now, if he came into your house, you would not like him because he might eat a hole in your clothes.”

“Do crickets eat clothes?”

“Yes, when they get into the house. But the fields are the homes of these little people and I do not like to frighten them here. Let’s leave Mr. Cricket now and hunt for another treasure.”

So away they went leaving Mr. Cricket safe and happy.

THE DRAGON FLY

“Look out! Buddy! There comes a devil’s darning needle!” cried Marylee. Uncle Jack and the children had come to the little creek running through the fields. A large insect with a long body and four long wings was flying above the water.

“It will not hurt you,” called Uncle Jack.

“But won’t that devil’s darning needle sew up our ears if we stay here?” asked Marylee.

“Of course, it will not do that, Marylee,” said Uncle Jack, laughing. “I know that many children say these pretty insects will sew up the ears of bad boys and girls, but that is just a fairy story. These insects are very good friends of ours, and I don’t like to call them devil’s darning needles. Dragon Fly is the much better name.”

“Don’t they feed snakes and doctor them when they are sick?” asked Fred.

“Oh, no, they don’t do that,” said Uncle Jack. “They are busy nearly all the time flying about and catching mosquitoes, flies, and other insects that are not good friends of ours.”

“Then they must be catching little insects when they dart this way and that,” said Buddy.

“There is another one,” cried Marylee. “It has spots



on its wings. I think they are beautiful, now that I know they will not hurt us.”

“They are very beautiful insects,” said Uncle Jack, “and so many different kinds. Some have green bodies, and wings that you can see through. Others have black and white spots on their wings.”

“There goes one now flying down and touching the water,” said Marylee. “Is it getting a drink of water?”

“They do not drink water,” replied Uncle Jack. “That is Mother Dragon Fly. She touches the water with her tail, and every time that she touches it, she lays an egg. The egg sinks to the bottom of the water.”



“Why does she lay her eggs in water?” asked Bess. “When the baby dragon flies hatch out of the eggs, won’t they drown?”

“No, because they get air from the water,” explained Uncle Jack. “There are bubbles of air in the water, so tiny you cannot see them. The baby dragon fly takes them into its body. That is the way it breathes, and so it does not drown.”

“Do they live on the bottom of the creek all the time they are babies?” asked Fred.

“Yes. When one is ready to change into a dragon fly with wings, it crawls up out of the water and hangs to a weed or grass stem. The skin splits down its back, and the new dragon fly crawls out of its baby clothes and flies away.”

“That is a queer way to live,” said Buddy. “While they are babies, they stay under the water like fish. Then, when they are grown, they fly and catch insects in the air like birds.”

QUEER WATER BABIES

“Uncle Jack, what is this thing? Will it bite me? Is it poisonous?” cried Buddy. Buddy had stopped by an old stump and was looking among some weeds. “Do hurry,” he called. “I don’t want it to get away, but I am afraid to pick it up. It has big wings, and it has great long horns sticking out in front of its head. They look like pincers.”

Uncle Jack and the other children came quickly to see the strange thing Buddy had found.

When Marylee saw it, she jumped back and cried, “Oh! Don’t let it bite me! What can it be, Uncle Jack?”

Uncle Jack reached down and quickly picked it up. “This is a queer treasure, but it cannot hurt you,” he said. “I am glad that you have learned not to pick up things until you know what they are. How many legs does this creature have?”

“I can see six,” answered Fred.

“We call a creature with six legs an insect,” said Uncle Jack. “This insect is a Dobson Fly. I know that this is Mr. Dobson Fly, because he has these long horns that are like pincers. Mrs. Dobson Fly does not have them. But he cannot pinch hard enough to hurt. See, I can put my finger into his pincers and he does not hurt me at all. But his babies have real pincers and they can



pinch so hard that I am very careful, when I pick them up, to hold them in such a way that they cannot hurt me.”

“Where can we find one of his babies?” asked Marylee.

“The babies live in the water like the babies of the dragon fly. They like to hide under the stones. You may find one if you look under these that lie along the edge of the water.”

Buddy and Fred began to turn over the stones. Soon Marylee asked, “Uncle Jack, what is this ugly thing? Its back is the color of mud. It is long and flat, with legs all along its body.”

"That is the baby dobson fly we are looking for," said Uncle Jack, when he saw it. He reached down to pick it up, but he was careful to take hold of it just back of its head. The baby dobson fly could not turn around and pinch him with its big jaws. But how hard it did try!

"How long does it take a baby dobson fly to grow up?" asked Marylee.

"Some of them live in the water like this one for almost three years before they get their wings and are grown-up dobson flies," replied Uncle Jack.

"They come from eggs, don't they?" asked Buddy. "What are they like?"

"Yonder are some on those leaves hanging over the water," said Uncle Jack, as he pointed to some leaves near Marylee.

"I don't see any eggs here," said Marylee. "There are some white spots on the leaves, but nothing else."

"That white stuff is a cover for the eggs," explained Uncle Jack. "The mother dobson fly lays about two thousand eggs. When the eggs hatch, the tiny insects drop into the water. They have to catch their own food and keep away from hungry fish that would eat them."

"Are you going to let both of them go now?" asked Bess.

"Yes, of course, we will turn them loose," said Uncle Jack. "They do not harm us, and we should let them live and be as happy as they can."

Uncle Jack put the young one back into the water, and turned the big dobson fly loose in the air.

A TREASURE WITH A HORN

“Uncle Jack! Where are you?” called Marylee.

“Here I am,” he answered. He saw she had something in her hand. “Have you found another treasure?”

“Yes,” said Marylee, as she came up to him. “I was looking at that vine over there, and saw that something had been eating the leaves. I tried to find what had eaten them, and I saw this big green worm with a horn on its tail. What can it be?”

“That is a fine treasure,” answered Uncle Jack, as he took the leaf with Marylee’s treasure upon it. “But are you sure that it is a worm?”

“I think that it is,” she answered. “We always call things worms that crawl like this one does.”

“I know that many people call them worms, but they are not worms,” said Uncle Jack. “We should learn to call things by their right names.”

“What is the right name for it?” asked Bess, who had come to see what Marylee had found.

“I think I know now,” said Marylee. “Last year Mother told us that the baby swallow-tail butterfly was a big caterpillar. Is this a caterpillar?”

“Yes,” answered Uncle Jack, “but this one is not a baby butterfly. It is a baby moth. Both baby moths and baby butterflies are called caterpillars.”

"Then what is a worm?" asked Fred.

"A fishworm or earthworm is a real worm," answered Uncle Jack.

"But I want to know more about my caterpillar," exclaimed Marylee.

Uncle Jack smiled and said, "All right, what do you want to know first?"

"I want to know if that big horn on its tail has poison in it. I am afraid of it."

"Many people are afraid of the horn," said Uncle Jack. "But there is no poison in it. This caterpillar cannot hurt you. Touch the horn with your finger."

Marylee obeyed. The horn was hard, but it was not sharp. It did not hurt.

"What are these funny spots on the sides of the caterpillar?" asked Buddy.

"Those are little holes," said Uncle Jack. "The caterpillar does not breathe through a nose the way we do, but it gets air through those holes."

"Does it have ribs?" asked Marylee.

"No, it doesn't have ribs nor any bones," answered Uncle Jack. "Insects do not have anything like bones inside their bodies. The caterpillars have hard skins and muscles to hold their bodies in shape. When they grow too big for their old skins, they throw them off and get new ones."

"Why do they do that?" asked Marylee.

"The skin of the caterpillar does not grow any more than Buddy's trousers grow," replied Uncle Jack. "When



Buddy grows too big for his trousers, he gets new ones. Don't you, Buddy?"

"Yes," answered Buddy.

"That is just what the caterpillar does," continued Uncle Jack. "But it must make its own new clothes. When it gets too big for its old skin, it grows a new one. The old one splits down the back, and the caterpillar crawls out in his new skin.

"What a queer way to get new clothes!" exclaimed Marylee.

"Does this caterpillar go to sleep before it becomes a

moth?" asked Buddy. "Mother told us that is the way the caterpillar of the swallow-tail butterfly does."

"Yes, this caterpillar will go to sleep, too," answered Uncle Jack. "First, it will dig down into the ground and make a little room for itself. It will then turn into a dark brown pupa with a handle like a jug."

"Why does it have a handle?" asked Marylee. "Does it want someone to carry it around?"

"No," replied Uncle Jack. "That is not a real handle, but there inside is its long mouth."

"What a queer place for a mouth," said Marylee. "It must be longer than the mouth of a butterfly."

"It is longer," said Uncle Jack. "When you look at the pupa you can see the baby wings under the brown shell. You can see the eyes, too. The pupa stays in the little room all winter. In the spring, it changes into a beautiful moth and comes out. Now, Buddy, can you tell all the things that a moth is, while it is a baby?"

"I think that I can, Uncle Jack," answered Buddy. "A moth lays eggs. Baby caterpillars hatch out of the eggs. The babies grow and keep changing their skins until they become big caterpillars. The big caterpillars change into pupas, and pupas become moths."

"That is well told," said Uncle Jack.

"What kind of a moth will this caterpillar be?" asked Marylee.

"It will be a humming-bird moth, or as it is sometimes called, a hawk moth."

"Do you mean a moth like those that come to our honeysuckle and look like humming birds?"



“Yes,” said Uncle Jack. “All the caterpillars that have horns like this one turn into humming-bird moths. Would you like to keep this caterpillar?”

“Yes, I would,” said Buddy. “But how can I do it?”

“Take it home with you, and get a glass jar. Put some earth in the bottom of the jar, then the caterpillar on the earth. There is a vine just like this one growing by the creek near the house. You must get fresh leaves from that vine every day and feed them to the caterpillar until it goes down into the earth. The moth will not come out of the pupa until late this summer, or early next spring.”

A HOUSE OF SILK

“Whew! What a big caterpillar! Uncle Jack! Marylee! Come and see it,” called Buddy, as he was looking into a bush. Of course, Uncle Jack and the other children went running to him.

“Where is it?” asked Marylee, when she came to the bush.

“It is right on that branch. Can’t you see it?” asked Buddy.

“Oh! That’s the largest caterpillar I ever saw! Why, it is as long as my hand!” said Marylee, when she saw it. “What are those funny things sticking up on its back? They look like warts, but they are too long and stick up too high to be warts. See those black hairs, too. They look like spines. Isn’t it ugly?”

“What you say look like warts are called tubercles,” said Uncle Jack. “That is such a long, hard word that we shall call them warts until you are older.”

“The warts are in rows,” said Bess. “Those big ones on the front are red, and there are yellow ones, too.”

“The rows on the sides are blue,” said Marylee. “What kind of moth will this caterpillar make, Uncle Jack?”

“It is called the Cecropia moth,” replied Uncle Jack. “That is not a very easy word, but I hope you can remember it.”



“It must be a big moth, because the caterpillar is so big,” said Fred.

“Yes, it is one of the largest and prettiest moths that lives here. It is almost as large as your two hands. I will show you a picture of it when we go back to the house.”

“What is the caterpillar trying to do now?” asked Marylee. “It is moving its head around and around and back and forth.”

“I see what it is doing,” said Buddy. “It is making silk. Is it going to make a web like a spider does?”

“Caterpillars do not make a web like the spider’s web,” replied Uncle Jack. “But the *Cecropia* builds a house of silk to live in when it is a pupa. But it does not go down into the ground like the humming-bird caterpillar does. The house, where the *Cecropia* pupa lives while it is changing from a caterpillar into a moth, is called a cocoon.”

“Where does it get the silk?” asked Marylee.

“It comes from a tiny hole in its lower lip,” replied Uncle Jack. “Every time that it moves its head, it makes more silk. It will keep on making silk until the cocoon is finished. Then it will go to sleep inside.”

“What is that big thing on this branch?” asked Buddy. He had gone around to the other side of the bush to see if he could find some more caterpillars.

“That is a *Cecropia* cocoon all finished,” said Uncle Jack, when he looked at what Buddy had found. “We’ll cut it open when I get out my knife.”

Uncle Jack broke off the little branch that had the cocoon fastened to it.

“Why do you need your knife?” asked Marylee. “Can’t you tear open the cocoon with your fingers?”

“No, not with my fingers,” said Uncle Jack. “The cocoon is as strong as silk cloth.”

Uncle Jack began to cut the silk. The outside cover was more like very strong paper than it was like cloth. There were some loose threads of silk under the outside cover. Under the loose threads was the real cocoon, which was smaller and much stronger than the outside

cover. At last Uncle Jack had it cut open, too. Inside, it was nice and smooth.

"Oh, it is dead," said Marylee. "Isn't that too bad?"

"No; it isn't dead," replied Uncle Jack. "That is the brown pupa, and it is sound asleep. Watch it wriggle when I touch it." Uncle Jack touched the pupa, and the back part of it moved.

"Where did the caterpillar go?" asked Buddy.

"Do you see that dried skin in the end of the cocoon?" asked Uncle Jack. "That is the caterpillar's skin. After he finished making the cocoon, he rested. Soon the skin split down his back, and was pushed to the back end of the cocoon, as the caterpillar changed to a pupa."

"I can see where its baby wings are," said Marylee.

"Yes, those are the baby wings. When the Cecropia caterpillar, we were watching on the other side of the bush, has finished his cocoon and wrapped himself in it, we shall take it home; so you can see the moth come out some day," said Uncle Jack.

TRAVELING BUTTERFLIES

“Uncle Jack, where have all these butterflies come from?” cried Buddy, as reddish brown butterflies flew about his head. “There is a whole flock of them, and they are all flying toward the north as if they knew where they were going.”

“They do know,” replied Uncle Jack, with a twinkle in his eye. “They are going home, and their home is a long way from here.”

“Butterflies don’t have homes that they go back to like people do,” declared Marylee. “At least, I never heard of it if they do.”

“You are right, Marylee,” Uncle Jack agreed. “Butterflies do not have houses for homes. But these butterflies lived in the north last fall. When the winter cold began, they came south where it is warmer, so that they would not freeze to death. Now they are going back for the summer, because the north is really their home.”

“Do you mean that these butterflies lived in the north last year, and then came south to spend the winter the way the birds do?” Buddy asked as if he were much puzzled.

“Yes, Buddy, that is what these Monarch butterflies do. Now that winter is past, they are going back north,” Uncle Jack assured him. “Most butterflies die when it



becomes cold in the fall. It is their babies which live as pupas during the winter, and then hatch into butterflies when it becomes warm in the spring. Those butterflies do not travel south for the winter. But the Monarch butterflies gather on the trees in great numbers when they are getting ready to go south. There are sometimes enough butterflies hanging together to fill a large basket. They all leave before the winter storms begin, and do not return until the milkweeds begin to grow in the spring."

"What are milkweeds?" inquired Fred.

"They are plants with large, thick leaves. When the leaves are broken, the sap comes out like drops of milk. But the sap does not taste like milk; it is bitter and sticky. The babies of this butterfly will eat nothing but the milkweed which grows in the north. The mother butterfly travels hundreds of miles, so that she can lay her eggs on these plants. You could never guess why it is that birds do not try to catch and eat her, while she is traveling so far."

"I thought that birds ate all kinds of butterflies whenever they could catch them," said Bess.

"They do like many kinds of butterflies, but they have learned that this butterfly does not taste good," said Uncle Jack. "The birds not only leave it alone, but they will not touch any other butterfly that looks like it. There is a butterfly known as the Viceroy which is really very good for birds to eat. But the Viceroy looks so much like the Monarch that it fools the birds. They think it is the Monarch and never eat it."

“That is a good joke on the birds,” Marylee remarked, smiling. “What does the caterpillar of the Monarch look like, Uncle Jack?”

“It has yellow and black stripes across its back which makes one think of a tiger,” he replied. “These bright-colored stripes protect it. This caterpillar is not good for the birds to eat, either. After the caterpillar becomes full-grown, it spins a little silk on the under side of a leaf. It then fastens the end of its tail to the silk and hangs with its head down. The striped skin splits on the back, and there is a beautiful green pupa with a row of wonderful golden spots that look like gold buttons. The reddish brown butterfly after a while comes out of this green pupa.”

“What a wonderful story!” said Buddy.

“Yes,” said Uncle Jack. “Perhaps you may learn another butterfly story some day.”

ALONG THE CREEK

*All things bright and beautiful,
All creatures great and small,
All things wise and wonderful,
Our Father made them all.*

C. F. ALEXANDER

A FIGHTING CRAWFISH

Buddy and Fred were wading in the shallow water of the creek. Fred stubbed his toe against a large stone. Then they tried to turn it over.

"I see something moving!" cried Marylee, from the bank.

"So do I. There it goes swimming away!" shouted Bess, as she ran along.

How it did dart through the water! Fred and Buddy dropped the stone and hurried after Bess.

"It hid under that other stone," said Bess, as she pointed into the water. "It stirred up so much sand that I could not see it very well, but it was swimming tail first."

"Oh, then, I know what it is," said Buddy. "It is a crawfish. They always swim backward." Buddy boldly put his hand under the stone, and felt around. Suddenly he cried, "Ouch! It's biting me!"

He jerked back. The crawfish was holding to his finger with one of its front feet that looked like a pair of pincers. But it dropped off into the water and darted back under the stone.

"Wait a minute," said Uncle Jack, as Buddy again started to reach under the stone. "I shall tell you how to catch it and not get pinched. Lift up the stone with one

hand, and with your other hand catch the crawfish by its back, just behind the pincers. You must do it quickly."

Buddy grabbed the crawfish, as his uncle told him, and held it up. It waved its big pincers around, trying to get hold of him.

"Let me take it," said Uncle Jack, "and I'll tell you about it. The crawfish has this hard shell all over its back, and so is not easily hurt. When the crawfish grows too big, the old shell cracks open on the back, and the crawfish comes out in a new soft one. This shell also becomes hard after a few days."

"Four of its legs have little pincers," added Fred.

"Yes, but it is the pair of legs near the head that have the big ones. These are made for fighting, and for catching worms and tiny fish for the crawfish to eat. This big strong tail is used for swimming." Uncle Jack turned the crawfish over, so that they could see the under side.

"Oh! See all those little white things under the tail!" cried Bess. "Why, they are alive and they all have tiny pincers, too!"

"We are lucky," exclaimed Uncle Jack. "This is a mother crawfish and her whole family of babies."

The children put their heads so close to see, that Mother Crawfish almost pinched Fred's nose.

"How do those baby crawfish hang on?" asked Buddy.

"They stick to those paddle-like things under their mother's tail. In the spring when she is ready to lay her eggs, she covers those little paddles, called swimmerets, with waterproof glue. Then she sticks her eggs on them



in little bunches that look like grapes. They stick there until they hatch. The babies keep clinging to the mother's swimmerets until they are big enough to swim. The babies are just like Mother Crawfish, only they are smaller, soft, and white. They have legs, pincers, eyes, and feelers."

"What are feelers?" asked Bess.

"The feelers are those two long hair-like things that stick out in front. The crawfish uses them when the water is so muddy that she cannot see where she is going. The feelers help her to know where the stones are; so she will not run into them."

“Poor Mother Crawfish,” said Bess. “Now I know why she was afraid and tried so hard to get away. She did not want her babies to be hurt. Let’s put her back into the water; so she can be happy again.”

Uncle Jack placed her in the water, and she darted backwards out of sight.

A SUNFISH GUARDING HIS NEST

Uncle Jack and the children sat down on the bank of the creek to watch some little fish in the clear water.

“Aren’t those beautiful little fish?” remarked Bess.

“They are pretty,” answered Uncle Jack. “I like their name, too. They are called Sunfish.”

“They are almost as bright as sunshine,” said Fred. “They seem to like to stay out where the sunshine is the brightest.”

“What a beauty this one near us is,” said Marylee. “Why is it swimming round and round in that one spot, and flapping its tail?”

“That is Mr. Sunfish, and he is making a nest for Mrs. Sunfish,” replied Uncle Jack.

“Does he do all the work?” asked Bess.

“Yes, he makes the nest by himself. When he has it finished, Mrs. Sunfish will lay some eggs in it, and then leave him to take care of them.”

“Doesn’t she help to take care of the eggs and the nest, and feed the babies when they hatch?” asked Marylee.

“No, she leaves all that work for Daddy Sunfish,” Uncle Jack replied.

Buddy added, “Mother told us that is what Mrs. Catfish does.”

"I think I would like to be Mrs. Sunfish," said Marylee. "How nice it would be if the men did all the work in the house!"

"Mr. Sunfish doesn't look as if he had a hard job," said Uncle Jack. "See how he sweeps the little stones out of the nest with his tail. There is one so large he can't sweep it out. But he won't have it in the middle of the nest, for he wants only clean, white sand. Now watch him get the stone out."

"He is picking it up in his mouth," exclaimed Fred. "Now he has carried it out to the edge of his nest, and dropped it. Is that the way he made that circle of stones around the edge of the nest?"

"Yes, that is the way he took out all the larger ones," answered Uncle Jack. "I believe the nest is finished now."

"There he goes to visit that other Sunfish," said Bess.

"That is Mrs. Sunfish," continued Uncle Jack. "He is going to tell her the nest is ready, and to ask her to come and lay some eggs in it. She isn't as brightly colored as he is. You will find that mother birds never have as pretty colors as father birds. It is the same with fish. Watch his colors grow brighter when he stops in front of Mrs. Sunfish."

"He looks like a rainbow," said Marylee. "See him spread out his ears. He wants her to see how pretty they are."

"Those spots of color on the sides of his head are not



ears,” corrected Uncle Jack. “They are just beauty spots. He is showing her how handsome he is.”

“I wonder what he is telling her,” said Bess.

“He does not talk with words the way we do,” replied Uncle Jack, with a smile. “But he is telling her what a beautiful nest he has ready for her.”

“Look, Uncle Jack!” whispered Marylee. “She is going to the nest with him!”

“Now she is swimming round and round in the nest. Why is she doing that?” asked Fred.

“She is laying eggs,” answered Uncle Jack. “Fish do not lay just four or five as the birds do. They lay hun-

dreds of eggs. The tiny eggs fall down on the bottom of the nest and stick to the sand."

"Look, Mrs. Sunfish is leaving the nest and swimming away," said Buddy. "Now what will Mr. Sunfish do?"

"He will guard his nest until the eggs hatch. That will take only a few days," said Uncle Jack. "Then the baby fish will swim away, and his work will be done."

"Doesn't he stay with his babies, and take care of them the way Daddy Catfish did when we saw him last year?" asked Marylee.

"No, he doesn't," answered Uncle Jack. "His babies have to take care of themselves as soon as they hatch. He only looks after the eggs. He keeps the other fish from eating them."

"There is a much bigger fish coming near the nest now," cried Buddy. "See how Mr. Sunfish is watching him."

"But Mr. Sunfish doesn't seem to be afraid," said Uncle Jack. "Now, watch him fight! See him pinch the fins of that big fish and butt him in the sides. There, the big fish has had enough, and he's glad to get away. That was a fine fight! He won't come back here again."

"What a brave little daddy Mr. Sunfish is!" said Marylee.

TADPOLE TO BULLFROG

"We must be going home before long," said Uncle Jack, as they walked along the bank of the creek.

"Why so soon?" asked Fred.

"There is a dark cloud coming, and I think that it will rain after a while," said Uncle Jack. "The cloud has already covered the sun."

"Let's find just one more treasure before we go," said Marylee.

"Please! Please!" begged the others.

Before Uncle Jack could answer, they heard something on the bank of the creek.

"Chug-er-um! Chug-er-um! Chug-er-um!"

"What is that?" whispered Bess. She was so frightened that she could not talk very well. It was a big voice, and it came from the shrubs and plants at the edge of the water.

Uncle Jack laughed and said, "That is your next treasure. Let's see if we can find him."

"Chug-er-um! Chug-er-um! Chug-er-um!" said the voice again.

"I don't think that I want to find that treasure," said Marylee.

"Tut! Tut! Marylee," said Uncle Jack, as he put his arm around her. "It is nothing that will hurt you. That is only a big bullfrog. He is telling everyone how glad

he is that the sun is behind the cloud, and that he hopes it will rain soon."

Marylee smiled at Uncle Jack. "I am not afraid of just a frog," she said. "He must be a big one, though, and I wonder if he looks like the toads in our garden."

"We must walk very quietly," said Uncle Jack, "or we shall scare him, and he will jump into the water."

As they tiptoed along, they looked for the bullfrog. Uncle Jack stopped suddenly. "He is sitting there on the bank under the leaves of that little weed. Can you see him?" whispered Uncle Jack, as he pointed ahead.

They looked and looked. At first, they could not see the frog, because his back was dark green, and looked almost like the leaves. Finally, everyone saw him.

"He is as big as my two fists," whispered Buddy.

"He looks something like a toad," added Fred. "But he doesn't have warts like a toad, and his legs seem longer."

The bullfrog saw them, and suddenly jumped into the water. He looked so long stretched out in the air, and he made such a big splash that Bess and Marylee both cried, "Oh!"

"There may be some baby frogs in the shallow water at the edge of the creek where the grass is growing," said Uncle Jack.

Marylee put her hands into the water. "What is this funny stuff, Uncle Jack?" she asked as she lifted something up. "It looks like white jelly, and it has some little round black things in it."

"Those are frogs' eggs," Uncle Jack told her. "Mother



Frog lays them in that jelly to protect them before they hatch.”

“What do the babies look like?” asked Bess.

“Don’t you see those little things wriggling through the water?” answered Uncle Jack. “Those are baby frogs. They are called tadpoles. Catch one!”

But that was not as easy as it looked. The tadpoles darted here and there.

“I have one,” cried Fred. “It is a queer little thing with a round body and long tail. I see two eyes and a mouth, but it does not have a head nor any legs.”

“It uses that little round mouth to eat the green moss

that grows on the rocks and stems of plants under the water," explained Uncle Jack. "Tadpoles cannot catch and eat insects like frogs do."

"Now I have one, too!" cried Buddy. "But mine has two little hind legs."

"Yes, the hind legs are beginning to grow on yours," said Uncle Jack. "The front legs will start to grow as soon as the hind legs get a little larger. His tail will get smaller as the front legs get larger. All the time he will be growing more and more like a real frog. Soon he will have a head and legs, and be a real frog. Then he will come out on the bank, and croak his song."

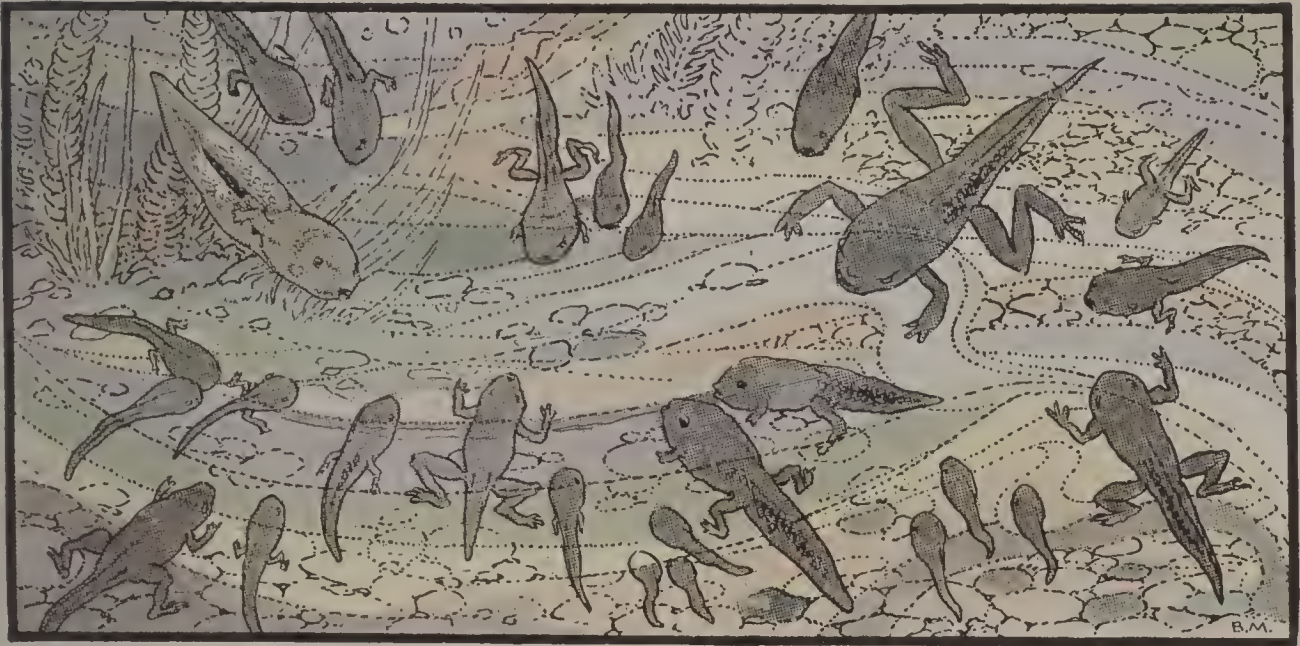
"Oh, I have one that has legs and a tail, too," said Marylee.

"Yes, yours is not a tadpole, and it is not a frog," said Uncle Jack. "It is just about to lose its long tail and be a frog. I like to call it a *tad-frog*. The poor little fellow cannot eat the green moss now, because his mouth has changed so that he cannot nibble it off. And his mouth is not yet large enough, so that he can catch insects."

"If he cannot eat moss like a tadpole nor insects like a frog, then what does he eat, Uncle Jack?" Fred wanted to know.

"He does not eat anything while his legs and head are forming. He gets his strength from his large tail which grows smaller and smaller, or it is absorbed, so we say, into the rest of his body."

"I understand now," cried Marylee. "He simply takes his tail into his body and makes a head and some legs out of it."



“That is right, Marylee,” agreed Uncle Jack. “And by the time his tail is all used up, his legs are large enough, so that he can hop. Then he comes out of the water to catch insects to eat. He is a real frog now, although a very small one. If we keep this *tad-frog* out of the water much longer, he may die just as a fish out of water does.”

“I will put him back,” Marylee said quickly. “Of course, I do not want him to die.”

“He is so scared he can hardly swim,” said Buddy.

“The trouble is that he is trying to use both his feet and his tail,” Uncle Jack explained. “When he was a tadpole, he had no legs and swam with his tail. Now that he is about to be a frog and has legs, he is trying to swim with them. It is as much fun to watch a *tad-frog* swim as it is to watch a baby walk. But the clouds are getting darker. It will soon rain. We must be going.”

WIGGLE-TAILS

Uncle Jack and the children were sitting on the porch that evening after the rain. Suddenly he slapped his arm. "These mosquitoes seem to think that I am a picnic dinner. But that one will not bite me again," he exclaimed as he looked at a spot of blood on his arm.

"Where did that blood come from?" asked Marylee.

"It came from my arm," Uncle Jack replied. "Mrs. Mosquito's bill is hollow, and as sharp as a needle. When she stuck it into me, she sucked my blood through it, like you suck soda water through a straw."

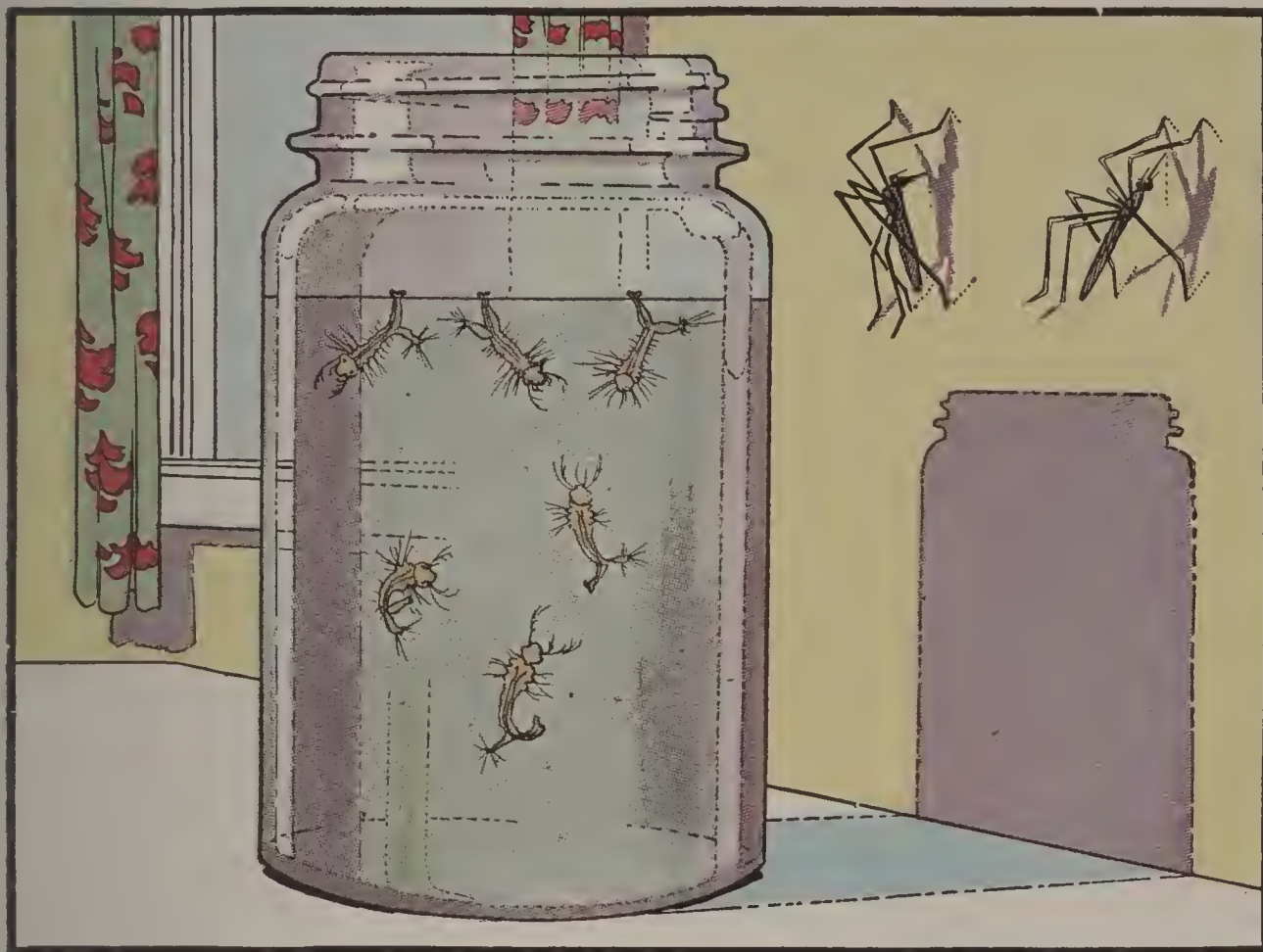
"How do you know that it was Mrs. Mosquito?" asked Buddy.

"Because it is Mrs. Mosquito who does all of the biting. Mr. Mosquito does not have so big and strong a bill as Mrs. Mosquito. He sucks nectar out of flowers, and juices out of berries and fruits, but he never bites nor sucks blood out of people."

Suddenly Buddy slapped his leg. "Ouch! one bit me. I don't like them. I wish I could kill them all."

"Yes, mosquitoes should be killed," said Uncle Jack. "The easiest way is to kill them before they get their wings."

"Where can we find them before they get their wings?" asked Buddy.



“You will find them in water that has been standing for some time, as in a barrel, in an old can, or in a small still pond. I am sure that you have seen them many, many times. Perhaps you called them wiggle-tails.”

“Oh, do wiggle-tails turn into mosquitoes?” asked Marylee. “I didn’t know that. Of course, we have seen wiggle-tails. I know where there are some now. There is an old tin can back of the house with some water in it from the last rain.”

“Let’s get it,” said Buddy. He and Marylee soon returned with the can.

“What is that thing on top of the water which looks like a tiny boat?” asked Marylee.

“That is a kind of boat,” replied Uncle Jack. “Mrs. Mosquito lays her eggs on top of the water and fastens them together as you see them, so that they will float. Each egg is so small that you can hardly see it. It is long, with one end down in the water. When the baby wiggle-tail is ready to come out, he makes a hole in the bottom end of the egg, and there he is right in the water where he wants to be.”

“He punches a hole in the bottom of the boat, doesn't he?” remarked Buddy.

“Yes, that is just what he does,” Uncle Jack replied. “We can't see the wiggle-tails very well in this can. Buddy, ask your mother for an empty glass jar.”

Buddy got a jar, and Uncle Jack poured the water from the can into it.

“My, how many there are of them!” said Marylee. “See them wriggle their funny little tails. They wriggle down to the bottom, and then, in a little while, they float up to the top. Why do they touch the top of the water with their tails, and hang for a moment with their heads down?”

“They are breathing,” answered Uncle Jack, “but not through noses like you do. They stick their tails just above the top of the water and breathe through them.”

“But some of them do not put their tails up to the top of the water, they stick up their ears,” declared Marylee. “Are they breathing through their ears instead of their tails?”

"Those little things do look like ears," said Uncle Jack, as he laughed, "but they are little tubes just back of the wiggle-tail's head. He gets air through those tubes so that he will not drown."

"Are these two different kinds of wiggle-tails?" asked Buddy.

"No," replied Uncle Jack. "The young wiggle-tails are the ones which breathe through their tails. When they become full-grown wiggle-tails, they stop breathing through their tails and breathe through these other tubes. They stop eating, too, because they are changing from wiggle-tails to mosquitoes and they do not yet have a mouth."

"They are almost like *tad-frogs*, aren't they, Uncle Jack?" Marylee remarked. Before Uncle Jack could reply, she cried, "Oh, look! look! The skin of that one at the top of the water is splitting down the back! It is popping open!"

The crack in the skin opened wider and wider. Slowly a mosquito pushed itself up through the crack. Carefully it stood on the empty skin which floated on the water like a tiny raft.

"How wonderful! How very, very wonderful!" exclaimed Marylee almost in a whisper, because she could hardly believe her eyes. "There sits a mosquito with head, eyes, wings, and legs, and it crawled out of that thing which did not look a bit like a mosquito."

"It is wonderful the way they change from wiggle-tails to mosquitoes," agreed Buddy, "but I don't like

them. What is the best way to kill mosquitoes, Uncle Jack?"

"While they are living in the water, they will soon die if they cannot get air," explained Uncle Jack. "They must come up for it, like you do when you are diving. Now, if you put a little oil on the top of the water, it gets into the breathing holes in their tails, and keeps out the air. So men put oil on ponds where there are wiggle-tails, and soon no more mosquitoes come from those places."

"I wish the places where these mosquitoes came from had been oiled," exclaimed Buddy, as he slapped his legs again.

"There would not be many here if you would turn upside down all the old cans and dishes around the house. If there is too much water for you to empty, pour a little oil in it. Wiggle-tails should not be allowed to live, for after a while they become mosquitoes and fly away. The bites of mosquitoes annoy people, and may cause them to have fevers. That is the way we get malaria."

"Let's look for wiggle-tails tomorrow, Buddy," suggested Marylee, "and pour oil on the water."

"All right. We'll kill everyone we find," replied Buddy.

LITTLE CREATURES WITH MANY LEGS

*Go forth under the open sky, and list
To Nature's teachings.*

W. C. BRYANT

GIVING A SPIDER ITS DINNER

"See what a pretty thing I have found," called Bess. Buddy was there first. "Oh, that is just a spider web," he told her.

"It looks like a big white silk handkerchief spread out on the grass," said Marylee.

"Why do spiders build such pretty nests?" asked Bess.

"That is not a nest," replied Buddy, laughing at Bess. "That is a trap in which the spider catches its food."

"Where is the spider?"

"Do you see that round hole in the side of the web? It goes down under that dead grass. Mrs. Spider hides in there so that the insects cannot see her. When an insect flies or crawls into the web, it gets caught in the sticky threads. Then Mrs. Spider rushes out and catches it."

"Buddy, how did you learn so much about spiders?" asked Bess.

"There is one in our garden at home. She is my pet. I feed her insects every day. When I put something into her web, she rushes out to get it. It is fun to feed her."

"Oh, let's feed this one," cried Bess.

They began to hunt for insects. Fred caught the first one. It was a little grasshopper. "Buddy, please feed it to her," said Fred.

Buddy told the children to stand away from the web. He said that Mrs. Spider would be afraid of them and not come out of her hole if they stood too close. Then Buddy reached over and dropped the grasshopper on the web. Its feet stuck fast. How it did kick and pull, trying to get loose! Mrs. Spider rushed out of her hole. She put her web around the grasshopper so quickly that the children could not see just how she did it. She rolled the grasshopper up into a little ball with the web all around it. The grasshopper could not wriggle a leg. Then she carried it back into her hole.

Bess and Fred looked at each other. Then they looked at Buddy, who was laughing at their surprise.

"Didn't I tell you it was fun to feed her?" he asked.

"It is fun," said Bess. "That's better than a picture show. Let's feed her something else."

Bess caught a big red ant and dropped it on the web. Mrs. Spider darted out of her hole again. But this time she stopped and looked at the ant for a little while. Then she wrapped it up in her web, but she did not take it back into her hole. She left the ant where it was.

"Now, why didn't she take my ant into her hole?" asked Bess.

"Mrs. Spider knows what is good to eat and what is not," laughed Uncle Jack, who had been watching the children. "Very few birds eat ants, because ants do not taste good to them."

"We saw the flickers eat ants," said Marylee.

"Yes," said Uncle Jack. "The flicker is one of the few birds in this country that will eat ants."



“I know that they do not taste good,” said Buddy.

“You never ate one, did you, Buddy?” asked Bess.

“I tasted some. The ants got into Mother’s honey, but they were so small that we did not see them. I put some of the honey into my mouth. All I could taste were the ants. Ugh, they tasted bad! I am not surprised that Mrs. Spider does not like them.”

“Uncle Jack, do spiders bite?” asked Bess. “The little boy who lives near me is afraid of them. Some people kill all they can find.”

“There are many kinds of spiders,” answered Uncle Jack. “Most of them will not bite you, even though you

catch them with your hand. But some of them can bite hard enough to make the blood come. A few will make you ill when they bite. It is best never to touch spiders. Then you can be sure that they will not hurt you. They are useful in the fields; so it is not right to kill them unless they are in your house.”

MARYLEE FINDS DANGER

"I'm going to find the next treasure," said Marylee, as she ran ahead of Uncle Jack and the other children. Soon she came to an old board fence. "I have found it," she called a few minutes later.

"What is it?" cried Buddy, as he hurried to her.

"It is some kind of a spider," said Marylee. She pointed to the top of one of the posts. "It is in the web under that board."

"I see," said Buddy. "Its back is as black as can be. It shines the way my shoes do after I have polished them."

"There's a bright red spot on its under side," said Marylee. "What kind of a spider is it, Uncle Jack?"

"That is a spider that you must never, never touch," said Uncle Jack. "It is called the Black Widow. You may die if it bites you."

"Oh!" said Marylee, as she put her hands behind her. "I didn't know that any spider was as bad as that."

"Many of the spiders will not hurt you any more than a cricket will," said Uncle Jack. "There are others that may hurt almost as much as a bee sting."

"Well, I'm not going to touch any of them if they hurt as much as those wasps that stung me," said Buddy.

"It is best never to touch any spider until you are old enough to learn which ones will bite and which ones will not," said Uncle Jack. "You can learn now to know the

black widow whenever you see her. There are several kinds of black spiders that have short legs and are covered with hair. The black widow is the only spider I know which has a bright black color, long legs, and no hair. Some of the black widow spiders have a spot or two of red on their backs, but others do not have those spots. However, all black widows have a red spot on the under side."

"Uncle Jack, should we kill the black widow whenever we find her?" asked Fred.

"Yes," replied Uncle Jack. "I never kill any of the other spiders, but I kill the black widows just as I kill rattlesnakes."

"What is that round gray ball in her web?" asked Bess.

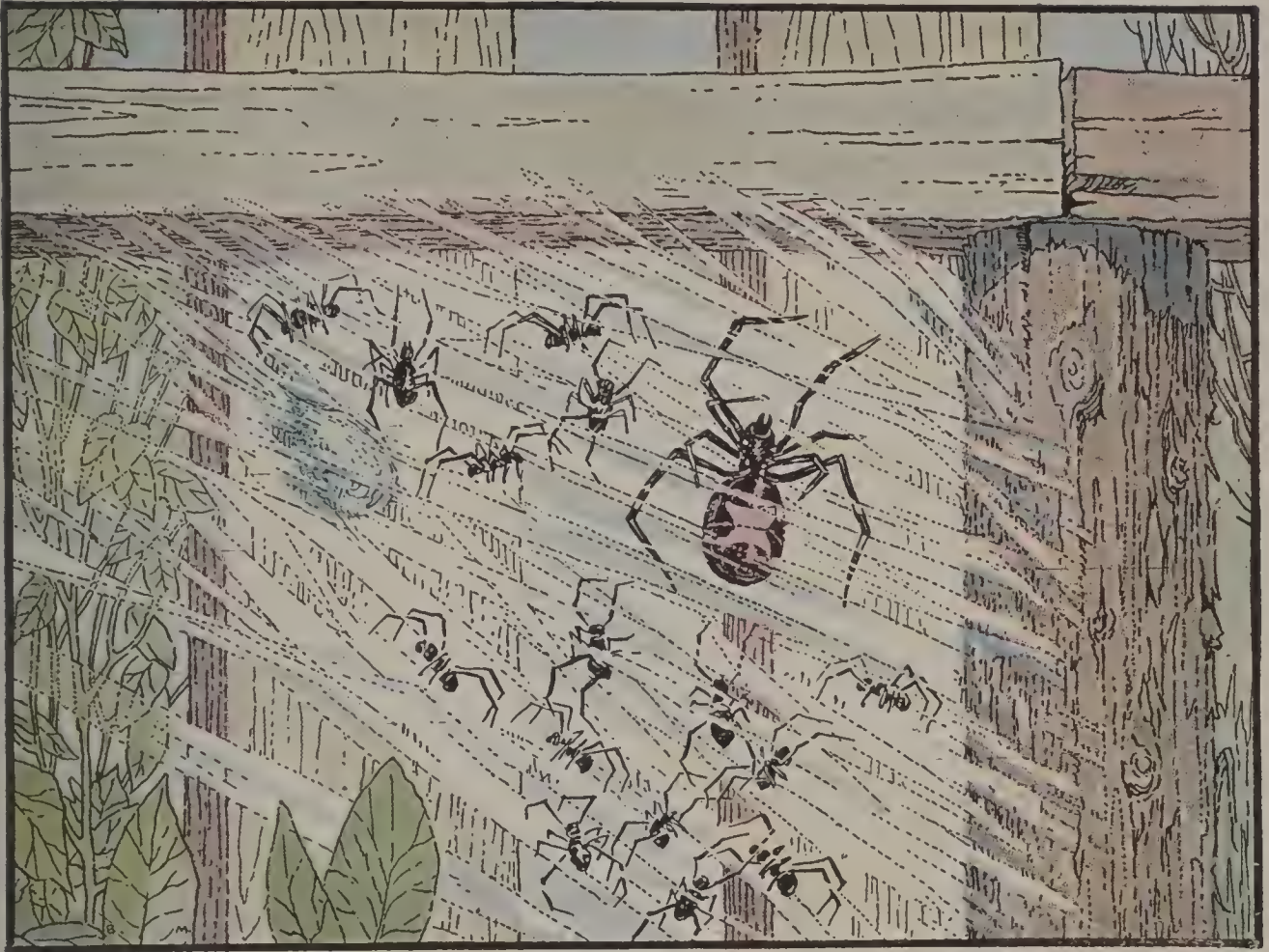
"That is a little silken bag," replied Uncle Jack. "Mrs. Black Widow makes the bag and then lays her eggs in it. The bag is strong; so the eggs are dry and safe inside. When the babies hatch, they crawl out."

"There are some little black things in the web that look like tiny spiders. Can those be baby black widows?" asked Buddy.

"Well, I did not see them before," answered Uncle Jack, as he looked at the web. "Yes, those are baby spiders, and there are more than a hundred of them. They have just come out of the silken bag."

"Spiders are not insects, are they, Uncle Jack?" asked Marylee.

"No," answered her uncle. "All spiders have eight



legs. The grasshoppers, butterflies, and wasps have only six. All true insects have only six legs when they are grown. But spiders and daddy longlegs have more than six legs; so we do not call them insects.”

“I am going to remember always that the black widow spider has long legs, and is shining black with a red spot on the under side,” said Marylee.

“Yes,” said Uncle Jack, “and be careful not to put your fingers into places where you cannot see. The black widow likes to stay under boards, rocks, and places where it is dark. She may bite you if you put your fingers where she is hiding.”

A MOTHER SCORPION

“I am going to look under this flat rock,” said Buddy. “There are lots of treasures under rocks.”

“Be careful not to put your fingers under it, because a black widow spider might be there and bite you,” said Marylee.

The children had walked ahead while Uncle Jack rested by the creek.

Buddy turned the rock over carefully. “Here is the funniest spider with a long tail,” he cried.

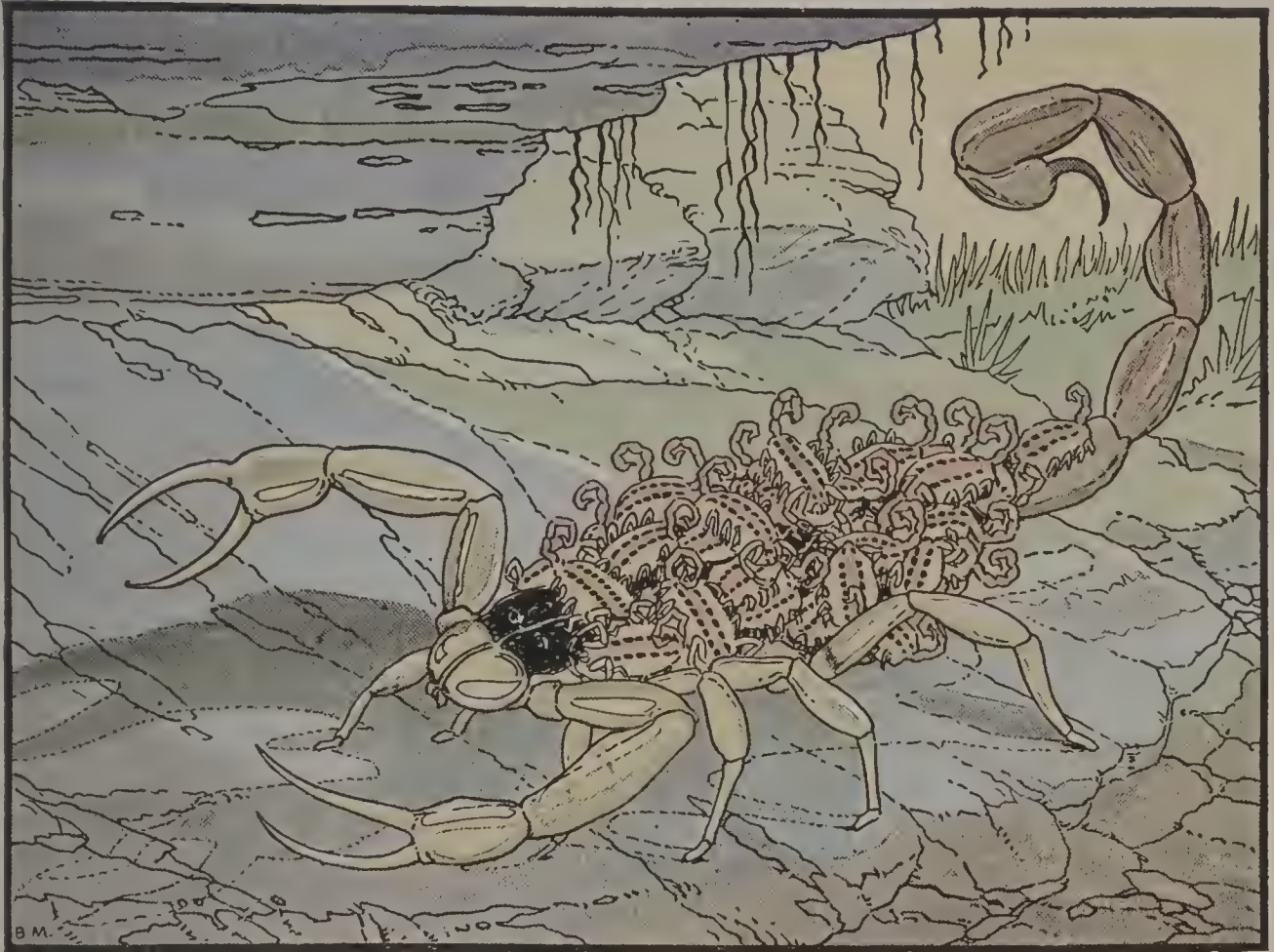
“No, that isn’t a spider, Buddy,” replied Fred. “It is a little crawfish. Can’t you see its pincers?”

“I am going to catch it in my hand,” said Buddy.

“No, no, Buddy!” cried Marylee. “You must not touch it. Don’t you remember Uncle Jack told us never to touch anything unless we knew what it was? It might sting you or bite you, or do something to hurt you. I am going to call Uncle Jack. Uncle Jack! Please come and see this queer animal that we have found.”

“All right,” answered Uncle Jack.

“Here we are,” called Buddy. “Fred thinks this is a crawfish because it has pincers, and I think that it is a spider because it has eight legs. Which one is right?”



“Oh, ho! What a fine treasure that is!” said Uncle Jack, when he saw it. “That is not a spider, and it is not a crawfish. It is a mother scorpion.”

“Buddy wanted to pick it up,” said Marylee, “but I told him that you said not to pick up things unless we knew what they were.”

“You are right to remember what I told you,” said Uncle Jack. “Buddy would have been very, very sorry if he had picked up this scorpion. Do you see the long tail that she holds over her back? Do you see that sharp point on the end of her tail?”

"I can see it," said Bess. "It looks like a rose thorn. What is it for?"

"That is her sting," explained Uncle Jack. "And she knows how to use it. She has a little sac of poison in the end of her tail below the sting. The sting is hollow. When she pushes it into your flesh, she squeezes a little poison through it. The poison goes into your body and that is what causes the pain."

"Is it as poisonous as the bite of the black widow spider?" asked Buddy.

"No, it isn't as bad as the bite of the black widow," replied Uncle Jack. "A scorpion's sting does not hurt much more than the sting of a wasp."

"I don't want her to sting me," said Buddy. "I haven't forgotten those wasps."

"What does she do with those pincers?" asked Bess.

"She eats insects, and she uses her pincers to catch and hold them," answered Uncle Jack. "She also fights with her pincers and her sting."

"What are those funny things all over her back?" asked Marylee. Then she cried, "I see now! One of them moved. They are baby scorpions. And they are riding on her back."

"Yes, they are baby scorpions," said Uncle Jack. "I saw them when I first looked at Mother Scorpion, but I wanted you to find them without being told."

"I see them now," said Buddy. "They are crawling around on her back. There is one climbing up her tail, playing circus."

“How does Mother Scorpion feed them,” asked Marylee.

“I had several mother scorpions and their babies one summer,” said Uncle Jack. “The babies didn’t do anything but sit on the mother’s back for two or three weeks. They did not seem to eat a thing, but they did grow slowly, and they shed their skins once. No one knows how they can grow without eating. Perhaps you will study them when you are older and will find out how they do it. Many people think that the babies slowly eat their mother until she dies. And then they are large enough to take care of themselves. But the mothers that I kept did not die. I am very sure that the babies did not hurt their mother. When they grew larger, they crawled down on the ground for a while and then climbed back on their mother. Later they left her and hunted for food.”

“Should we kill scorpions when we find them?” asked Fred.

“I don’t think so,” replied Uncle Jack. “They do no harm out in the fields. Of course, if they come into the house, you must do something with them so that you will not get stung.”

“Let’s leave this mother and her babies alone then,” said Marylee.

A HUNDRED PAIRS OF LEGS

“Snake! Snake! It is in there!” screamed Bess, who was near a clump of weeds.

The others ran toward her. Fred picked up a big stick.

“No, no, Fred!” called Uncle Jack. “Don’t hurt it until I get there and see what kind it is.”

“It’s—it’s there in the weeds,” said Bess. She was so frightened that she could hardly talk. “I — I almost stepped on it.”

Uncle Jack came closer. “I see it,” he said. He stooped, reached among the weeds, and caught something. Then he stood up, holding in his hand a squirming, wriggling snake.

“Oh, Uncle Jack, it will bite you!” cried Marylee.

“No, it won’t,” replied he. “But I don’t care if it does. I have had snakes like this one bite me many times.”

“Why didn’t you die when they bit you?” asked Bess. “I thought that people always died when snakes bit them.”

“Well, I am not dead yet,” laughed Uncle Jack. “There are good snakes and bad snakes. This is one of the good snakes. The bad ones have two long, sharp teeth in the top of their mouths, which are poison teeth. Their bite makes one sick and sometimes it kills a person.”



“Doesn’t this snake have long poison teeth?” asked Buddy.

Uncle Jack was holding the snake carefully by the neck. He did not hurt it. He pulled open the snake’s mouth so that the children could look in it.

“Why, its teeth are just baby teeth,” said Marylee. “They aren’t big enough to hurt anyone.”

“No, they are not,” said Uncle Jack. “The little snake will try to bite, and it will pinch your fingers. If you pull while it is pinching, the tiny teeth will scratch a little, but there is no poison in them.”

“What a queer little black tongue with a fork on the end of it,” said Marylee. “Isn’t it poisonous?”

“It isn’t any more poisonous than your tongue is,” laughed Uncle Jack, as he put his finger close to the mouth of the snake and let the little tongue touch it.

“Do you want to let it lick your finger, Marylee?” asked Uncle Jack. “It will not hurt you.”

Marylee was almost afraid to do it. She put her finger close to the mouth of the snake. Out came the little tongue and licked her finger.

“Let me do it! Let me do it!” cried the other children, when they saw that Marylee was not afraid.

“What does this little snake eat?” asked Fred.

“This snake with the yellow stripe down the middle of its back is called a Garter Snake. It eats earthworms, insects, frogs, and toads.”

“How can it kill a frog with those tiny, tiny teeth?” asked Fred.

“It doesn’t kill the frog,” said Uncle Jack. “The snake swallows the frog alive.”

“Oh! How terrible!” cried the girls.

“It does seem terrible to us,” said Uncle Jack. “But you must remember that the toad swallows beetles alive. Some of the beetles eat other insects alive. It is the way the wild things have learned to eat.”

“I don’t see how a snake with such a little head can swallow a frog,” said Buddy. “A frog is much bigger than the snake’s head.”

“The frog is much bigger, but the snake swallows it,” said Uncle Jack. “The back part of the snake’s jaws

spreads apart and the skin of the cheeks stretches like rubber. If Buddy had a mouth like a snake, he could swallow a whole apple pie at one time."

"How can a snake run so fast?" asked Buddy.

"The snake walks on the ends of its ribs," said Uncle Jack. "Each rib is a leg fastened to one of these scales underneath. When it runs, it moves its ribs back and forth. That moves the scales. Don't you think that you could run fast, too, if you had a hundred pairs of legs?"

"Yes," laughed Buddy, "if I could make them all work together. Sometimes the two that I have get mixed up and I fall down. But, does the snake really have a hundred ribs that it uses for legs?"

"Some of them have that many ribs. If you don't think that a snake can work them together, just watch this one run," and Uncle Jack put it down on the ground. The little snake glided away in the grass, happy to be free once more.

"Before we hunt for other treasures, there is something more I want to say about snakes," said Uncle Jack. "This is one of the rules for you to remember always: Never pick up any kind of snake unless some older person is with you who knows that the snake will not harm you. You do not know enough to tell good snakes from bad snakes, and you might pick up one that will bite you and make you very, very ill."

AN ANIMAL IN A BOX HOUSE

“Uncle Jack, do you see what I see?” asked Buddy, as he looked toward some weeds.

“What queer thing are you seeing now?” asked Uncle Jack, as he stopped beside him.

“I don’t know. That is what I wish you would tell me. It looks like a stone moving very slowly over there.” Buddy pointed to something that was about the size of half an indoor baseball with the flat side on the ground.

“Go and look at it. That is the way to learn what things are. Don’t ask me to tell you everything. Find out all you can for yourself.”

Buddy did not wait any longer. Before he got to it, it stopped moving. It had no head, no tail, and no legs, that Buddy could see. It did not seem to be alive. Buddy wanted to pick it up, but he remembered the wasps. Then he saw a little head slowly peep out at him from under one edge.

“Hey! Everybody come quickly!” he called. “See what a fine treasure I have found!”

“Do you know what it is?” asked his uncle.

“Yes; some kind of a turtle.”

“A good guess. But there are many kinds of turtles. Some live in the sea, some in rivers and lakes, and some live on the land like this one. Many people call all of



them turtles, because they do not know the real names for them. It is right to call those that live in the sea, turtles. But those that live in rivers and lakes should be called terrapins. Those that go around on the land all of the time are called tortoises. This one is a Box Tortoise. How long do you think you will remember all of that?"

"I will remember it this way," said Bess.

"Terrapin in the river;
Turtle in the sea;
Tortoise on the land,
Just like you and me."

"That is fine. I am sure you will remember it now," laughed Uncle Jack. "Fred, pick it up."

"Will it bite me?" he asked.

"Don't get your fingers too close to its head."

Fred picked up the tortoise, and turned it over.

"Where did his head go?" asked Bess. "I know he has one, because I saw it."

Buddy said, "That shell bottom has a door at each end. He pulls in his head, his legs, and his tail, and then closes the doors."

"Put him down on his back, Fred," said Uncle Jack. "Then let's hide behind a bush and watch him."

They did as Uncle Jack suggested.

Nothing happened for a few minutes. Then they saw each end of the shell bottom move a little. Yes, it was just as Buddy had said. Each end had a little door. They saw the head and two legs stick out of one door, and two legs and a little tail out of the other. Slowly the head came out farther and farther. At last the nose touched the ground. The tortoise pushed his head against the ground and turned himself over on his feet. Then he began to crawl away. The children ran to catch him. When he saw them, back into his shell he went and closed the doors again.

"He has a tight box to live in," said Bess.

"Yes, and so strong that not many things can hurt him. Can they, Uncle Jack?" asked Fred.

"Very few things can hurt the tortoise when he is in his box, and he always has it with him," replied Uncle

Jack. "Did you know that his ribs are outside of his body?"

"How can that be?" asked Fred. "I thought that ribs were always on the inside."

"The tortoise isn't like other animals," continued Uncle Jack. "His ribs grow together and make his shell. He wears them on the outside to protect his body."

"What do tortoises eat?" asked Marylee.

"Tortoises don't have any teeth, but the edges of the mouth are so sharp that they can bite juicy leaves and fruits," replied Uncle Jack.

"It's my time to find a treasure now," said Bess, as they left the little tortoise where they found him.

A FIGHTING LIZARD

“Here is a big flat rock,” called Bess. “Do you think it hides a treasure, Uncle Jack?”

“Yes, rocks usually hide treasures,” said Uncle Jack. “Many insects and little animals like to hide under them. I will lift this one up for you.”

The children stood around the rock while Uncle Jack lifted it.

“Oh! Oh!” screamed the girls, as they jumped back.

“Look out!” cried the boys, as they ran backward. “It’s a lizard, Uncle Jack! It’s a big green lizard!”

The lizard did not run away. It stood with its mouth wide open and looked angrily at them. It seemed to be trying to make up its mind which one had turned its house over.

“He must be poisonous!” cried Marylee. “I can see down inside his throat, and it is all black!”

“Shall I get a stick and kill him?” asked Fred.

“No, Fred,” answered Uncle Jack, quickly. “You must never kill any of the little lizards.”

“But isn’t he poisonous?” asked Fred.

“Oh, no,” replied Uncle Jack. “He will not hurt you. Lizards are very good friends of mine. I like them so much that it makes me angry to think of anyone hurting them.”



“I think that this one is beautiful, now that I know he will not poison me,” said Marylee.

“He is such a pretty green, and that black collar makes him look dressed up,” said Bess.

“He is called the Collared Lizard because of that collar,” said Uncle Jack.

“But he will bite even if he isn’t poisonous, won’t he, Uncle Jack?” asked Buddy.

“Yes, he can and will bite if he gets a chance, because he thinks that you will hurt him. He is very brave and will fight as hard as he knows how. When he gets hold of anything, he will not let go for a long time. He has

such tiny teeth that he can't hurt any more than a little garter snake can. He just pinches."

"Won't you show us how he bites?" asked Buddy.

"I don't like to tease him" said Uncle Jack. "But I will just this time; so you can see what a brave fighter he is."

Uncle Jack took a long stick and tied his handkerchief around the end of it. He waved the handkerchief back and forth above the lizard. The lizard opened his mouth very wide. What a big mouth he had! Suddenly he jumped up. Snap, went his mouth as he caught the handkerchief. He closed his eyes and hung on. Uncle Jack shook the handkerchief, but the lizard still hung on as he swung in the air.

"How can you make him let go now?" asked Buddy.

"That will be easy to do," answered Uncle Jack, as he picked up the lizard in his hand. Gently he opened the lizard's jaws. The lizard tried to pinch his fingers, but Uncle Jack just laughed and kept his fingers out of the way.

"Now I am going to show you a lizard that can run on two feet," said Uncle Jack. "Watch him."

Uncle Jack put the lizard on the ground and let him go. He ran on all four feet, for a little way. Then he went so fast that his front feet seemed to be in his way. He raised up his body, lifted his front feet off the ground, and ran on his two back legs. The children laughed and laughed as they watched him almost flying over the ground.

"Lizards are interesting," said Fred. "I like them."

“Yes, and the better you know them the more you will like them,” said Uncle Jack. “There are many kinds of lizards in the United States, but there is only one that is poisonous. That is a big ugly one that lives in New Mexico and Arizona. It is called the Gila Monster. Some lizards live on the ground and hide under rocks like this one we just saw. Others live in the trees and can climb as well as squirrels.”

“Did you ever have one for a pet, Uncle Jack?” asked Buddy.

“Oh, yes, I have had several. Most of them became so tame that they never tried to bite. They ate flies, beetles, and grasshoppers from my fingers.”

“Do they live to be very old?” Marylee asked.

“I have a friend that has had one for seven years,” Uncle Jack replied. “She keeps it in her house. She feeds it insects in the summer. When insects are scarce during the winter, she feeds it a bit of egg from a medicine dropper.”

“I wish I could have one for a pet,” said Marylee.

“You may have one when you are a little older,” said Uncle Jack.

QUEER ANIMALS

There is a pleasure in the pathless woods.

LORD BYRON

A POCKET FULL OF BABIES

“Oh, Uncle Jack! Look, over there among the trees! What is that walking on the ground?” Marylee cried.

“I see it,” said Fred. “It looks like a big gray cat. But it is not a cat; it has a long nose.”

“Look at those things on its back,” exclaimed Bess. “It is coming this way. Let’s hide behind some brush; so we can see it better.”

They all hid.

“Oh!” whispered Bess. “I see what it is. It’s Mother Opossum, with her babies on her back.”

“I see six of them on one side,” counted Marylee.

“And there are five or six on the other side,” said Buddy. “They are holding on to her hair with their feet and mouths, and their heads are in a row along her back.”

“Mother Opossum is taking her babies out for a ride while she hunts for her dinner,” said Uncle Jack, very quietly. “She does not often go hunting in the daytime. She likes to hunt at night; for she can see in the dark as well as a cat.”

Mother Opossum stopped to smell the ground. She scratched under some dead leaves, and grabbed something with her foot. Then she put it to her mouth and ate it.

"What did she find to eat?" asked Fred.

"She must have found a nice fat insect," answered Uncle Jack. "That is what she eats most of the time."

"Do you think that we could catch her?" asked Buddy.

"Perhaps," answered Uncle Jack. "But be careful not to hurt her or her babies."

"But will she hurt us?" asked Fred. "I don't want her to bite me."

"She cannot bite you if you catch her by the tail," said Uncle Jack.

"But don't you think it will hurt Mother Opossum to pick her up by the tail?" asked Marylee. "I know it hurts cats and dogs to pull their tails."

"It will not hurt her," replied Uncle Jack. "Her tail is very strong. She often uses it when she climbs trees, and sometimes she wraps it around a limb and hangs with her head down."

"That is the way monkeys use their tails," said Buddy. "But monkeys have hair on their tails, and Mrs. Opossum's tail is smooth like a rat's."

"We must hurry if we are going to catch her before she gets away," said Fred.

Away they ran after Mother Opossum. She did not wait for them. She took one look at those big boys running toward her. Then she turned and scampered through the trees. The babies did not make a noise, but clung tightly to their mother's sides.

When Uncle Jack came up to the children, they were standing around a big pile of brush.

"She — went — in — there," panted Buddy.



After they had rested a little while, Fred said, "Let's move the brush and find her."

The children went to work. Fred lifted the last armful, and there lay Mother Opossum curled up with her eyes shut, and her teeth showing between her lips. She did not move the least bit, nor open her eyes.

"You boys have killed her," said Marylee, about to cry. Fred and Buddy looked as if they were sorry.

"We didn't even touch her," Buddy exclaimed.

Uncle Jack laughed.

"Don't look so unhappy," he said. "She isn't hurt."

"But she is dead, Uncle Jack," declared Bess. "Her

eyes are shut, and she does not even move her toes.”

“Mother Opossum is playing that she is dead, so that you will go away and leave her alone. Step back a little way and keep very still. Now watch her.”

They stood and watched. Soon one eye opened slowly. Then a foot moved gently.

“Oh, she is alive!” cried both the girls, as they ran to her again. Mother Opossum saw them coming, and closed her eyes quickly.

“But where are her babies?” asked Marylee.

The children looked at each other with eyes wide open in surprise. They had forgotten all about the baby opossums when they thought the mother was dead.

“I wonder where they are,” said Fred, as he picked up a stick and began to hunt among the dead leaves for them. The other children helped in the hunt. They looked and looked, but no baby opossums did they find. Uncle Jack did not say anything while the children were hunting, but his face was all smiles.

Finally, he said, “I know where they are.”

“Do tell us, please.”

“Buddy, when you have a treasure that you do not want to lose, what do you do with it?”

“I put it in my pocket.”

“And that is just what Mother Opossum does with her baby treasures.”

“But she doesn't have a pocket.”

“Oh, yes, she does. I will show you.”

He picked up Mother Opossum by the tail and carried her over to a grassy place where they could sit down.

She did not even open her eyes when Uncle Jack picked her up. After they sat down, Uncle Jack turned Mother Opossum over on her back.

“What is that on her stomach?” asked Bess.

“That is her pocket full of treasures,” said Uncle Jack.

Just then a sharp little face with bright eyes peeped at them through an opening in Mother Opossum's skin.

The girls clapped their hands and laughed with joy. The baby jerked its head back inside.

“Oh, do let us take one out of the pocket, Uncle Jack,” begged Marylee.

“Yes, please do,” begged Bess.

Uncle Jack took out one of the babies and put it on Marylee's hand.

At first, the little thing was frightened, but Marylee held her hand very still. Soon the baby seemed to think that Marylee was a friend. It stood on its feet and walked around on her hand. She put one finger of her other hand down by the baby opossum. The little tail wrapped around her finger and held on tightly. Marylee raised her finger, but the little opossum did not let go. Higher and higher Marylee lifted it until the opossum was hanging with its head down and its feet waving in the air.

“See its funny little front feet!” cried Bess. “They have a thumb and four pink fingers almost like a baby's hand.”

Marylee put the opossum down in her lap. It made a queer noise almost like a puppy trying to bark.

“Why does it make that noise?” asked Bess.

“I think it is lonesome and wants to get back to its mother,” said Uncle Jack.

Marylee put it on Mother Opossum near the pocket. It quickly found the pocket and crawled inside with its brothers and sisters. Uncle Jack then laid Mother Opossum on the ground, and he and the children went off through the woods. They looked back to see what Mother Opossum was doing. She was walking off toward the brush with her babies.

AN ADVENTURE WITH A SKUNK

“Hist!” said Uncle Jack, in a low voice to the children, as they crept through some brush. “Don’t talk. Don’t make any noise. I want you to see something that I am seeing.”

They stopped when Uncle Jack did, and peeped over some brush. He told them to come closer and look. He was pointing at something that was moving.

“What can it be?” whispered Marylee. “It looks like a big black and white cat. Do cats come out here, Uncle Jack?”

“I know what it is!” said Buddy, who was very much excited. “It is Mother Skunk and her family of little ones.”

“Good boy,” whispered Uncle Jack, as he patted Buddy on the back. “That is the way to use your eyes.”

Mother Skunk had come much nearer by this time. Her long hair was very black.

“Is that a white cap on her head, and two ribbons down her back?” asked Bess.

“It does look like a cap with ribbons,” whispered Uncle Jack. “But it is only a spot of white hair on top of her head and two stripes of white hair on her back.”

“What a pretty tail!” said Buddy.

Her tail was very beautiful and bushy, almost black,

with a few white hairs in it. Sometimes she held it over her back, and sometimes almost straight out behind her.

“Aren’t the little fellows cunning!” said Marylee.

There were three of them, and they looked and acted just like Mother Skunk. But they were much smaller. She and her babies came to a flat rock among the trees near Uncle Jack and the children. She turned the rock over quickly with one front foot. She slapped her other front foot down on a big black beetle that had been hiding underneath it. The baby skunks rushed up and chased several other insects that tried to get away. Then Mother Skunk turned over other rocks, and she and her babies ate the insects they found.

“What are they saying to each other?” asked Fred.

“They seem to be very, very happy,” answered Uncle Jack. “Now let’s see what Mother Skunk will do when she is angry. I shall be careful to throw this stick so that it will not hurt her or her babies.”

He threw the stick near the skunks. Mother Skunk stopped and looked all around. He then threw another stick. She raised her tail over her back until the end nearly touched her head. She looked around again and again, trying to find out where the sticks were coming from.

“See how bushy her tail is now, and how she holds it over her back!” said Uncle Jack, in a low voice. “That is the way she always does when she is angry.”

He threw a larger stick. This time it bounced and hit her. She put her nose down between her front feet for a short time. Then she looked up. How angry she was!



Her hair stood straight out from her body. She stamped her feet on the ground so hard that they could hear her thump, thump! She scratched the grass. The little skunks fluffed up their hair and raised their tails over their backs. They did not seem to know what it was all about, but they were doing just as Mother Skunk was doing. They were so funny that Marylee laughed out loud. Mother Skunk heard Marylee, and suddenly saw her. Then she started in a run for Marylee. Her babies followed behind.

“Run!” cried Uncle Jack. “Run for the car.” He pushed the children forward and ran after them. Then

they smelled such a bad odor! They did not stop running until they reached their car. By that time they could see the skunks no longer.

“We were certainly lucky to have kept out of reach of that angry mother,” laughed Uncle Jack, as they started off.

A PET IN A SHELL

The children were helping Uncle Jack put away the lunch things in the car when Fred suddenly cried, "Look, everybody! Isn't that a Box Tortoise and her babies walking through the brush yonder?"

"Let's catch them!" shouted Buddy.

"Wait a minute!" said Uncle Jack. "Don't be in such a hurry. That can't be a Box Tortoise because they never go walking with their babies. They just lay their eggs in the ground and then go off and forget them. When the eggs hatch, the babies have to take care of themselves. No, that must be something else."

"I can see they have shells on their backs," remarked Fred.

"We may be able to get close enough to see what they are if we walk quietly and keep behind the brush," said Uncle Jack.

Soon the children were peeping over a bush near the animals. They had shells, but not like the box tortoise. These shells grew in rings so that the animals could bend their backs.

"It's Mother Armadillo and her family," whispered Uncle Jack. "See how they stick their noses into the ground at almost every step they take. They are hunting for insects and earthworms."

One of the babies stopped and dug a little hole with his front feet. He put his nose down into the hole and caught something in his mouth. He began to pull. It was a big earthworm. Soon another baby ran up and tried to take it away from him.

"Fred, you and Buddy may catch one of the babies if you want to," continued Uncle Jack. "But you will have to run fast to do it."

The boys ran out from behind the brush. Mother Armadillo and the babies went scampering away, but Fred caught one of them. He held it by the tail, because he was afraid it would bite.

"It will not bite you," said Uncle Jack, as he took it and held it in his arms. "Armadillos don't have any teeth in the front part of their mouths; so they can't bite. The teeth with which they chew their food are in the back part of their mouths."

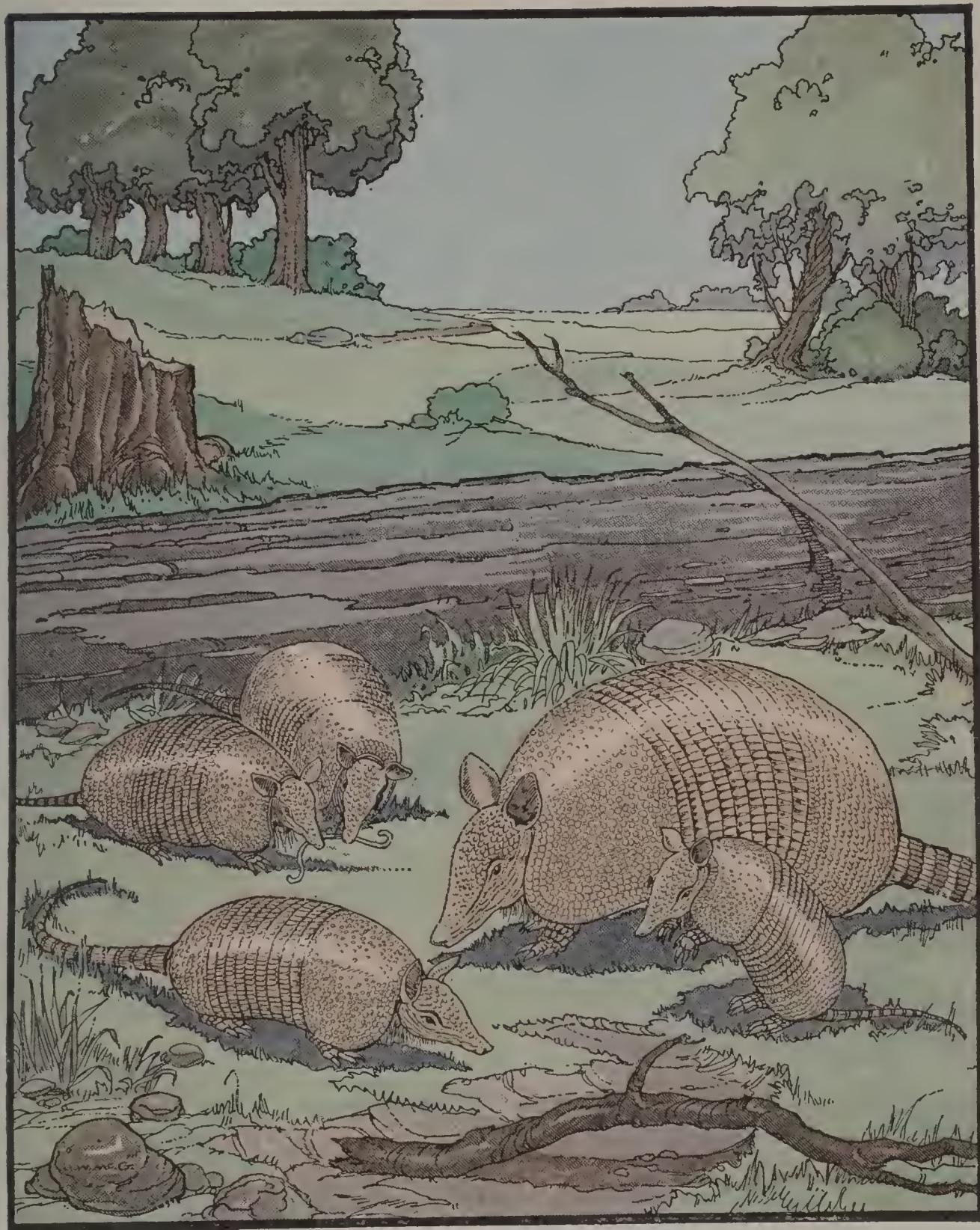
"There are nine rings of shell across its back," said Marylee, counting.

"And rings all along its tail, too," added Bess.

"That is so he can roll himself into a ball to keep from being hurt," said Uncle Jack. "He has a shell on the front of his head, too. The shell on this baby is not very hard, but it will be harder when he is grown."

"What big claws he has!" exclaimed Marylee. "He must be a digger for insects and worms."

"Yes," said Uncle Jack; "armadillos also dig holes in the ground to live in. They stay there during the day and come out to feed at night. These babies got so hungry they couldn't wait for dark."



"Let's feed this one."

"Well, he might eat a grasshopper or a beetle."

The children raced off to catch one. Marylee brought back a big grasshopper. The baby armadillo was afraid at first and would not eat. When Marylee held it close to his nose, it must have smelt good to him. He opened his mouth and took it. After he swallowed it, he put his front feet on Marylee's hand and smelled around as if he were trying to find another one.

"Uncle Jack, he is so nice. May we keep him?" begged Marylee. "We can take him home and feed him all the time."

"It will not be easy to catch insects for him every day," said Uncle Jack.

"Won't he eat fresh meat?"

"You will have to teach him to eat it. I once trained one to eat fresh meat. I mixed the meat with earthworms. He liked earthworms as much as you like candy. Each time I fed him I put in fewer earthworms with the meat, but he always ate both. Then I tried some meat with just a very little earthworm. He soon found that the meat itself was good."

"I'll dig the earthworms, and we'll soon have him eating meat," said Buddy.

"Armadillo is too long a name for him," said Marylee. "Let's call him Arma."

"That will be a good name," Uncle Jack said as they started to the car with the new pet.

THE CHAMPION DIGGER

“Look at all those piles of sand!” said Bess. Uncle Jack stopped the car, and he and the children got out. “Who has been playing here, Uncle Jack?”

“These little piles of sand all in a row do look as if some one had been playing,” he replied. “Can’t any of you guess who made them?”

“I can’t guess who did it,” said Fred. “I can’t even see where they got the sand. There are no holes where they dug it up.”

Buddy pushed one of the piles aside with his foot. He found a little round hole in the ground filled with fresh sand.

“This looks as if it had just been filled up,” said Buddy. “I am going to open it.”

The hole was big enough for him to get his hand into it. Deeper and deeper he dug, until there was no more loose sand. He pushed his arm far into the hole.

“Uncle Jack, this hole runs back farther than I can reach. Some animal must have dug it and made those piles.”

“You are right, Buddy,” said Uncle Jack. “These holes and piles of sand are made by an animal. He spends most of his time digging under the ground. He has to get the earth out of his way; so he digs a hole up

to the top of the ground. Then he pushes the sand up through it."

"He must be the champion digger," said Buddy. "Just see all these piles. There are twenty-six of them."

"He digs for his dinner," said Uncle Jack. "He feeds on the roots of plants. He digs until he comes to a root that he likes. If he isn't hungry, he cuts off the root and puts it into one of the little storerooms he has. There he keeps it until he is hungry. When he wants to go to another place, he digs through the ground to it."

"What's his name?" asked Buddy.

"He is a Pocket Gopher," answered Uncle Jack. "I see a fresh pile of sand near that bush. He may be working there now. Pocket gophers usually work at night, but sometimes they dig in the daytime when the sun is not shining. If we get behind the bush and are quiet, perhaps we can see this one."

They hid behind a thick bush and peeped over the top. They saw a pile of fresh sand with a hole in the center of it. Then they saw some sand coming up out of the hole. The sand came up higher and higher, and behind the sand was the brown head of the gopher. He was holding his two front feet with their big claws in front of his face, and he was pushing the sand with them. He came out of the hole and pushed the sand away. Then he went back.

"Oh, he is a funny animal!" exclaimed Buddy. "He looks like a rat, but he has a bigger head."

"Did you see his little short tail?" asked Bess.

"Those are the biggest claws that I ever saw," said



Fred. “No wonder he is the champion digger when he has claws like those.”

“Did you see the loose skin on the sides of his head, and his big teeth?” asked Buddy. “He must be a good fighter with such big teeth.”

“He is a good fighter,” said Uncle Jack. “He doesn’t like company. He will not let another gopher stay near him. He wants to be all alone. He needs those big teeth to cut off the roots of plants. That skin that you saw on the sides of his head makes his pockets.”

“Are they real pockets that he can carry things in?” asked Marylee.

“Yes, they are real pockets, and in them he carries pieces of roots when he takes them to his storeroom,” answered Uncle Jack. “Those pockets give him the name of Pocket Gopher.”

“Let’s look into his hole,” said Buddy.

But they could not do so, because when they came to it, they saw that the gopher had filled it with sand.

“When did he do that?” asked Bess.

“He heard us talking,” said Uncle Jack, “and he closed his door.”

BIRD'S NEST OR WHAT?

"Those bushes along the fence would be a good place for a bird's nest," said Uncle Jack.

"Come on," said Buddy. "Let's see if we can find one there."

They began looking in the bushes. Soon Marylee called, "I have found one! Come and see it."

"That is a funny one," said Buddy. "It isn't open on top like the nests of other birds. It looks like a round ball of grass. How does the bird get into it?"

"I see!" answered Marylee, who had gone around the bush to see the other side of the nest. "Here is a little hole in it on this side. That must be the doorway. It isn't any larger than my thumb."

"I see something moving on the inside," said Buddy, who was now peeping through the hole.

"Oh! Did you ever see anything so cunning?" said Marylee, as a little mouse poked its head out through the hole in the nest and looked at them. Its tiny black eyes shone like beads. It wriggled its whiskers as if to say, "What are you doing here?"

The little face looked so funny that the girls laughed aloud. Quick as a wink the mouse jerked its head back out of sight.

"That is Mrs. Harvest Mouse and her nest," said Uncle Jack.

"I didn't know that mice built nests like birds do," said Fred.

"Many kinds of mice make their nests in the ground," said Uncle Jack. "The Harvest Mouse makes its nest in tall grass or bushes like this one has. Sometimes it finds an old bird's nest and makes that into the kind it likes."

"Do you think that Mrs. Harvest Mouse has some babies in her nest?" asked Marylee.

"She may have," answered Uncle Jack.

"I am going to find out," said Marylee, starting to push through the branches. Mrs. Harvest Mouse ran out of her nest when Marylee shook the bush, but she did not go far. She ran through the top of the bush like a squirrel. She stopped a little distance away, and sat on a branch while she watched Marylee. She was very much afraid; so she soon jumped down to the ground and hid in the grass.

Marylee put her finger through the hole into the nest.

"Uncle Jack, there are some babies in the nest!" she cried. "I can feel them. They are soft and warm. May I take one out so that we can see it?"

"Yes, if you are careful not to hurt it. You must put it back before it gets cold," replied Uncle Jack.

Marylee took out one of the baby mice and held it in her hand. It was a tiny thing, soft and pink.

"It can't see," said Marylee. "It is blind. It can't open its eyes!"

"The babies of many animals do not have their eyes



open until they are several days old,” remarked Uncle Jack. “The eyes of this baby mouse will open when it is a few days older. You had better put it back now before it gets cold. I am sure the little mother wants us to go and leave her babies alone.”

Marylee carefully put the baby mouse back into the nest.

“Why is it called a Harvest Mouse?” asked Bess.

“The word *harvest* means to gather seeds, like wheat and oats and corn, that are growing in the fields,” answered Uncle Jack. “We harvest, or gather, seeds. Then we take them to the mill where they are ground into

flour or meal, or we store them in barns. Some of these mice live where the ground is covered with snow all winter. All the seeds are covered, and the mice cannot find food. They gather, or harvest, the seeds of grasses and weeds in the fall, and put the seeds away in their nests. Then they eat them during the winter. That is why they are called Harvest Mice. Now, the mice that live where there is little snow do not need to put away seeds for the winter. They can always find them on the grasses or the weeds. But still they are called Harvest Mice."

THE WHISTLER

“Uncle Jack, I saw something I must ask you about,” said Bess.

“What did you see?” asked Uncle Jack.

“I don’t know,” replied Bess. “It looked like a stick standing straight up from the ground. It was about six inches high, and as thick as three of my fingers. But it made a queer whistling sound and then it was gone; so I know that it wasn’t a stick.”

“Let us walk back and look for it,” said Uncle Jack.

“There it is!” exclaimed Bess, pointing.

“That’s only a stick,” said Buddy.

“No, it isn’t,” remarked Bess. “Didn’t you hear it whistle then? That is some kind of an animal.”

“You are right, Bess,” said Uncle Jack. “It is a little animal, and he is called the Striped Gopher by many people. That is not a very good name for him, because he is not at all like the Pocket Gopher which digs under the ground all the time. But I call him the Striped Gopher, anyway, because his real name is too long and hard for you to remember.”

“What is his real name?” asked Fred.

“The Striped Spermophile,” replied Uncle Jack, smiling.

“Whew! That is a long name,” said Fred. “I am going to call him the Striped Gopher, too.”

“What makes him look like a stick, Uncle Jack?” asked Marylee.

“He does look very much like a stick when you are not close to him, because his head is the same size as the rest of his body. His ears are so small that you cannot see them, unless you are quite near. Then he holds his front legs so close to his body that you cannot see them. And, too, he stands up very straight.”

“May we get closer to see him better?” asked Bess.

“We can get behind that bush there without scaring him if we are very quiet,” replied Uncle Jack.

“I can see him well now,” said Marylee. “He has rows of little white spots down his back. See how bright his tiny black eyes are!”

“There he goes,” said Buddy, as the little animal suddenly dropped his front feet to the ground and raced through the grass to his hole.

“Let’s see where he lives,” said Marylee.

“Wait just a minute,” said Uncle Jack, holding Marylee back. “If you watch the hole a while, you may see him again.”

They stood watching for a few minutes.

Then Marylee whispered, “I see his head.”

He stuck his head out of his hole and looked at them with his bright eyes. Then he whistled again.

“Why does he whistle when he sees us?” asked Buddy.

“That is the way he tells all the other striped gophers that there are strangers near,” replied Uncle Jack.



“When they hear that whistle, they take warning. I think this one will not come out again while we are so near. Let us look at his hole now.”

They went to the little round hole in the ground.

“Does it go down into the ground very far?” asked Fred.

“Yes, it goes down a long way,” replied Uncle Jack. “At the end is a little room where he lives. He also has some other rooms where he puts seeds to eat in the winter time; for he gathers seeds, too, like the Harvest Mouse.”

A FLYING MAMMAL

“Uncle Jack, here is the queerest creature up in this bush,” called Marylee. “I don’t know what it is. Come and see if it is alive.”

Uncle Jack came to see what it was that Marylee had found. He pushed aside the leaves, so that he could look into the bush. “A fine treasure, Marylee,” he said. “That is a bat hanging by its toes and having a quiet sleep.”

“Is it the kind of bat that we see flying around in the evening?” asked Marylee.

“Yes,” answered Uncle Jack. “It works hard at night and likes to sleep during the day. Some kinds of bats get into old barns, houses, or caves to sleep. But this kind likes fresh air; so it goes to sleep in a bush or tree.”

“I don’t see how it can hang by its feet all day,” said Fred. “I get tired in just a little while when I hang by my knees.”

“The bat doesn’t get tired because it has strong toes, whose sharp claws are like little hooks. It fastens these toes around a twig and hangs there without ever getting tired.”

“Oh, it has waked up now,” cried Marylee. “See, it is making faces at me. Isn’t it the funniest thing you ever saw? It must be trying to tell us to go away and let it sleep. Look at its sharp little teeth!”



“It needs those sharp little teeth to catch and eat mosquitoes, gnats, and moths when it is flying around in the air and getting its supper,” explained Uncle Jack.

“This bat has wings like a bird,” observed Marylee. “But its teeth are like a mouse’s, and it has fur instead of feathers. Why! it even has ears. Isn’t this the queerest bird, Uncle Jack?”

“It does fly like a bird,” he agreed; “but it isn’t one. It is a flying mammal.”

“Why do you call it a mammal?” asked Buddy. “I never heard of a mammal before.”

“All animals which feed their babies milk such as the

cat, the dog, the rabbit, and the cow are called mammals," explained Uncle Jack. "The mother bat flies, but she also feeds her babies milk; so we call her a flying mammal."

"I'm surely glad you told us, Uncle Jack, what a bat really is," said Marylee. "We are looking at its back now, aren't we? I want to see what the other side looks like."

She walked around the bush and peeped through the leaves to see the under side of the bat. "Come around here," she cried. "Aren't those two little bats hanging there on the big one?"

Uncle Jack and the children walked around the bush where they could see, too. "You are right, Marylee," Uncle Jack said. "Those are baby bats. The mother bat carries them like that most of the time."

"Don't they fall off when she flies?" asked Bess.

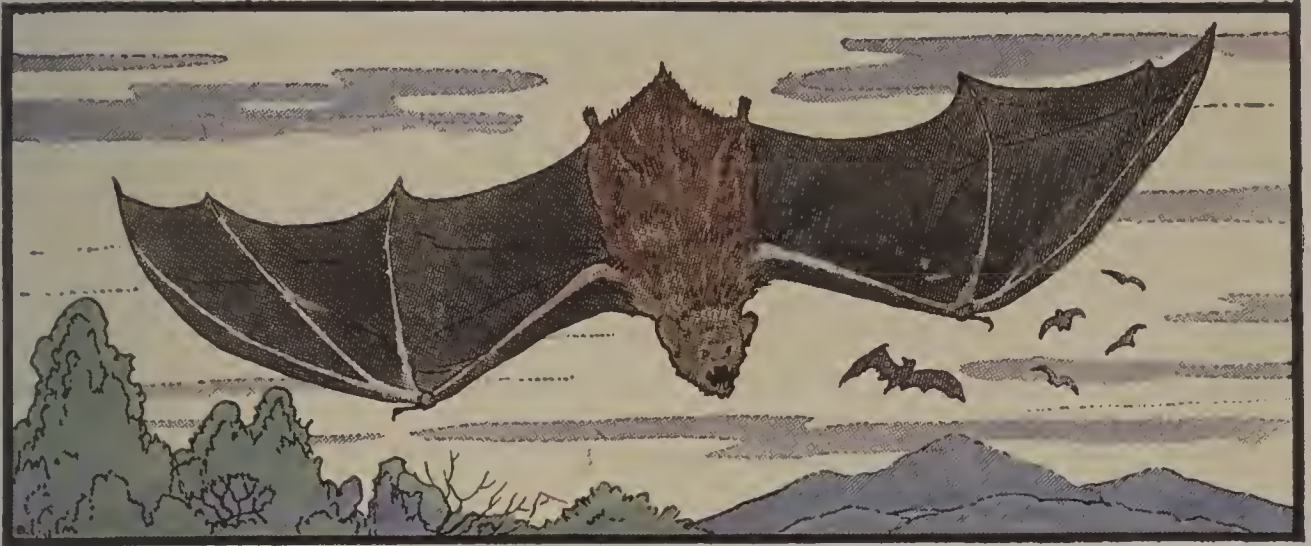
"No," he answered. "They hang to her fur with their feet."

"They must have a lovely time riding with their mother when she flies about!" said Marylee. "I almost wish I could be a baby bat."

"Do you see the little tent in which she keeps the babies dry when it rains?" asked Uncle Jack.

"Where? I don't see it," said Marylee, looking eagerly.

"The mother has some loose skin fastened around her tail and to her hind legs," explained Uncle Jack. "Can you see how it is folded down over her babies like a tent?"



“Oh, yes, I see it now,” said Marylee. “I am so glad I found a sleeping bat. I have seen them flying many times, but I never knew they were so interesting.”

FEATHERED FLIGHTS

*Hast thou named all the birds without a gun?
Loved the wood-rose, and left it on its stalk?*

* * * *

O, be my friend, and teach me to be thine!

R. W. EMERSON

A BIG-HEADED FISHERMAN

“What is making that noise?” asked Bess. They all stopped to listen to a sound from up the creek.

“Tat-tat-tat-tat,” came the sound so fast that it was almost a rattle.

“What is it, Uncle Jack?” asked Bess.

“I’ll not tell you,” said Uncle Jack, smiling. “It will be a nice surprise when you see it. Let us go back and sit quietly on the bank of the creek and watch.”

“Tat-tat-tat-tat-tat,” came the sound closer.

“Here it comes,” whispered Marylee. “Why, it’s a bird!”

They saw a queer bird flying down the creek toward them. Just before he got to them, he lit on a dead branch of a tree that hung out over the water.

“What a big head and bill he has!” said Buddy. “They are almost as big as the rest of his body. What made his head grow so large?”

“Just watch and you may find out for yourself,” answered Uncle Jack.

“Oh! Look!” said Bess. “He is falling off the branch into the water!”

Down fell the little bird, almost straight toward the water. He went head first, not even using his wings. Splash, into the creek he plunged.

"Buddy! Fred! Wade out and get him before he drowns!" cried the girls.

"Sit still and see what happens," quietly said Uncle Jack. Quickly the little bird came to the top of the water and flew up to the branch.

"Look! He has a fish in his bill," cried Buddy. "Why, he didn't fall off that branch; he dived for that fish."

"Yes," explained Uncle Jack. "That bird is a real fisherman. He needs a big head and strong bill to catch and to hold the fish. He is called the Kingfisher because he is such a good fisherman. The feathers standing up on the top of his head look like a king's crown. That is why he is called king. The dark feathers on his breast look like a belt. So we say he is the Belted Kingfisher."

"What is he trying to do now? Is he trying to kill the fish?" asked Fred.

"Yes. Watch him and see how he does it!"

The kingfisher held the fish by the tail, and beat it against the branch. Whack! Whack! Then he stopped and felt of the body of the fish with his bill. He did not think that it was dead; so he took hold of the tail again. Whack! Whack! Whack! He pounded it again and again until he was sure it was dead. Then he took it into his mouth and swallowed it head first.

"Won't the fish bones hurt him?" Bess asked anxiously.

"No," replied Uncle Jack. "He is used to them. After a while he will eject, or as we might say throw up, the bones. Then he will be ready for another fish."

"Such a queer bird ought to have an interesting nest and babies," said Marylee.



“The belted kingfishers do not build their nests in trees as many other birds do,” continued Uncle Jack. “They dig a hole in the side of a bank near the water.”

“How can they dig?” asked Fred.

“They dig with their strong bills. Two of their toes grow together. It may be that those toes help to push the dirt out of the hole. Those odd toes also may help kingfishers to swim. They feed their babies fish, and the babies eject the bones just as the old birds do. Kingfishers are not very neat housekeepers. They leave the old fish bones in the nest. By the time the babies are ready to leave, the nest is almost full of bones.”

“What queer birds!” said Bess.

“Yes, they are,” agreed Uncle Jack, “and each family of kingfishers seems to have its own fishing waters. Two families never live near each other, and they fish only in their own part of the creek.”

BIRDS THAT EAT AS THEY FLY

“Uncle Jack, what kind of birds are those flying over the creek?” asked Buddy. He had been watching the birds as he and the other children sat on the bank eating their lunch. “They just keep flying all the time,” he continued.

“Those are Cliff Swallows,” replied Uncle Jack. “There is one high in the air. See how fast he flies. There, he almost stops. There, he darts off to one side. Now he is dropping nearly straight down. He is flying up again. He is turning around now, and coming back just above the water.”

“Why does he fly here, there, and everywhere like that?” asked Bess. “Is he playing?”

“No, indeed. He is getting his dinner of the insects that are flying in the air all the time. The swallow flies along until he sees an insect, then he darts after it. Some of the insects can fly very fast. Then it is a real race, and the swallow has to turn this way and that before he can catch one. When you see him suddenly turn to one side, you may be sure he has seen an insect and is trying to catch it.”

“But, Uncle Jack, don’t they ever get tired, and stop?” asked Buddy.

“Yes, but not very often,” answered Uncle Jack. “They have very tiny feet that are not strong like the cardinal’s or the mocking bird’s. It is hard for them to sit on the large branch of a tree. When they do stop, they choose a dead twig, a wire fence, or a telephone wire.”

“Oh, did you see that swallow?” cried Marylee. “He flew down so close that he splashed the water. Perhaps he will be more careful next time.”

“He wanted to do that,” said Uncle Jack. “He was getting a drink.”

“How could he get a drink that way?” asked Marylee.

“He flies very close to the water. Then he opens his mouth so that the under part of his bill touches the water. He is flying so fast that the water splashes up into his throat, and he swallows it.”

“That is a queer way to get a drink of water,” said Marylee.

“Uncle Jack, you said that those cliff swallows ate insects,” said Fred. “But I see two of them on the ground. They are on the other side of the creek close to some soft mud, and I can see them eating the mud.”

“No, Fred. They are not eating mud,” laughed Uncle Jack. “They pick up the mud in their bills. Then they carry it away to make their nests. The cliff swallows use mud plaster for building nests. The nest is round with a hole on one side for a door. Do you see that steep cliff yonder beside the creek?” Uncle Jack pointed to a rock cliff higher than a house. Near the top, it hung over like the eaves of a roof.



"The swallows are building their nests underneath that overhanging rock," continued Uncle Jack. "That is why they are called cliff swallows."

"Let's see if we can find the nests," said Fred. They ran to the cliff. They saw the odd round nests made of mud with a hole on one side. The nests were high up and right under the rocks that stuck out like a roof.

One of the nests was only half made. While they were looking, a swallow lit upon it. They could see the mud in the bird's mouth. The swallow put the mud on the edge of the wall which he was building, and then flew away.

"Do the swallows make a bed inside of the nest?" asked Bess. "And what do the eggs look like?"

"They usually make a bed of a few pieces of grass," answered Uncle Jack. "And their little eggs are white, speckled with brown."

"Do all swallows build round nests with a hole in the side for a door, like these cliff swallows?" asked Fred.

"No," said Uncle Jack. "There are different kinds of swallows. Some of them make mud nests that are open at the top. One kind of swallow makes a hole in a bank, and builds its nest in the hole. They are called Bank Swallows."

BUSY BIRDS

“See that beautiful little bird sitting in the tree! It is blue all over its back and wings, and even its head is blue,” said Bess. “But see what a pretty dull red on its breast!”

“There is another one in that tree,” said Buddy, pointing. “But that one is not so brightly colored.”

“They are Mr. and Mrs. Bluebird,” Uncle Jack told the children. “You girls wear pretty ribbons and dresses, and the boys do not care about such things. But it is Mr. Bluebird that wears the pretty bright colors. He dresses up as fine as any girl, but Mrs. Bluebird wears just a plain work dress. They came back from their vacation just a little while ago.”

“Birds don’t take a vacation, do they?” asked Buddy, very much surprised.

“Yes, they do,” said Uncle Jack, as he smiled. “Mr. and Mrs. Bluebird work nearly all summer while you are playing. Then they go south for the fall and winter. The first thing they do when they get back is to find a place to build a nest. If you were a bird, where would you build your nest, so that it would be dry and warm, and where cats, snakes, and bad little boys could not find it?”

"I would put my nest up high in a tree where there were many leaves," answered Buddy.

"That would be a good place," said Uncle Jack. "Some birds do build their nests in just such places. But Mr. and Mrs. Bluebird do not. They want a better place. They hunt until they find a hole in an old dead stump or a fence post. They like a hole which some woodpecker made last year with his strong bill. Down in the bottom of such a hole the bluebirds make their nest."

"Let's see if we can find an old woodpecker's hole," said Marylee.

"I will find the first one," said Buddy. Off they ran to search for one.

They hunted for a long time. At last Fred called, "Here! Come here! I have found one!"

He had found a little round hole in a dead tree.

"Look at the Bluebirds," said Bess. "They have come over here, too, and they are watching us, as if they did not want us to look into that hole. Do you think it is their nest, Uncle Jack?"

"It may be," answered Uncle Jack. "If it is, we must be very careful not to hurt the eggs or the babies."

"Oh, Fred! Do hurry and see what is in there. We can't wait," cried both girls. Fred climbed up on Buddy's back and looked into the hole. Then he jumped down to the ground. He was smiling.

"It is the Bluebirds' nest," he told them. "The babies are all covered with stubby feathers. It is dark in the hole, so that I could not see them at first."

Then each of the children climbed up and peeped into



the hole. After they had looked into the nest, Uncle Jack said, "Let us sit down behind those bushes and see if Mr. and Mrs. Bluebird will bring something for their babies to eat."

Soon Mrs. Bluebird flew over to the hole. She peeped in to see if her babies were all right. Then she flew away. After a while she was back with a caterpillar. Just as she left the nest, Mr. Bluebird came with a grasshopper. Then Mrs. Bluebird brought some kind of insect, but they could not tell what it was. Again and again they saw the birds come back to their nest, and each time they had some kind of insect in their bills.

"Do they work as hard as that all summer?" asked Buddy.

"Yes, they work almost all summer just the way you see them working today," said Uncle Jack.

"These babies will soon be big enough to fly away," said Fred. "What will Mr. and Mrs. Bluebird do then?"

"They will begin to raise another family," answered Uncle Jack.

"What a great number of insects they have to catch to feed two families!" said Marylee. "I am glad that I am not a bluebird and have to work as hard as that."

"I don't think that they are unhappy because they have so much work to do. Did you hear Mr. Bluebird stop long enough to sing that little song just then?" asked Uncle Jack. "You see they love their children, and they are happy in working for them. Your mothers are working for you nearly all the time, too. They cook good things for you to eat; they clean the dishes; they

wash your clothes; they gather up your things from the floor; but they are happy because they love you, and like to do things for you."

"It isn't hard to do things for people you love," said Fred. "But I am glad to know that Mr. and Mrs. Bluebird will have a vacation after working so hard all summer."

A BIRD THAT FOOLED THE CHILDREN

As Uncle Jack and the children were walking under a low tree, a bird flew to the ground just in front of them. It tried to fly away, but one wing dragged as if it were broken. The bird fluttered in the air a little way, then it fell to the ground again.

“Look at that poor little turtledove!” cried Marylee. “Its wing is broken.”

“May we catch it?” asked Bess.

“Yes, if you can,” answered Uncle Jack, laughing.

A little bird with a broken wing was not at all funny, but the children did not stop to ask Uncle Jack why he was laughing. They ran after the bird.

Several times Marylee thought she had it. Buddy fell down and Bess fell on top of him. The bird kept just a little ahead of them. Suddenly it rose into the air and flew away. The children watched it fly to a tree; then they looked at each other.

“It — it was just fooling us. It wasn’t hurt at all,” said Marylee.

“It played a good joke on us, all right,” said Buddy. “I wonder why.”

“There is Uncle Jack back there by the tree, and he is laughing at us,” said Fred. “He knew the joke all the time.”



They walked back to Uncle Jack. "That little dove was a good actress," said Uncle Jack. "She made you think she was hurt so badly that she could not fly. She hoped you would follow her."

"But I can't see why she wanted us to follow her," said Fred.

"She wanted you to go away from this tree, and that was her way of getting you to do it," explained Uncle Jack. "She is a mother turtledove, and she did not want you to find her nest on that branch over Marylee's head."

They looked up. There was a nest. It was a very poor one, made of just a few sticks placed on a limb. Two baby turtledoves were sitting in the nest. The children could see them plainly from the ground.

"The turtledove is not a fighting bird," said Uncle Jack. "So when an enemy comes near, the mother bird acts as if she were hurt, and tries to get the enemy to follow her away from her nest."

"I didn't know that birds were as smart as that," said Buddy.

"What has become of the rest of her babies?" asked Marylee. "I see only two there. Do you suppose the others have fallen out of that little flat nest?"

"No," replied Uncle Jack. "She never has more than two babies at a time. She lays only two pure white eggs. When these babies are large enough to fly, she will raise another family, just as Mr. and Mrs. Bluebird do."

"Does the turtledove have to work as hard as the bluebirds do to find enough insects for her babies to eat?" asked Buddy.

"No, she does not feed her babies insects," Uncle Jack answered.

"Does she feed them seeds?" Fred asked.

"No, she does not feed them seeds, either, when they are very young," Uncle Jack again replied.

"Well, then, does she feed them fish like the kingfisher, or mice like the owls?" demanded Marylee.

"No, Marylee!" Uncle Jack smiled as he shook his head. "She feeds her babies milk."

"You must be joking, Uncle Jack," said Buddy. "Surely, no bird makes milk the way cows and cats and dogs do. You said those animals were called mammals. Are turtledoves mammals, too?"

"No, turtledoves and their relatives, the pigeons, are not mammals. They are birds. But they do feed their babies a kind of milk, called *pigeon milk*. The bottom of the bird's throat is enlarged and is called the crop. The milk is made in this crop. When the baby turtledove, or pigeon, is hungry, it puts its bill inside the mother's mouth. The mother bird makes the milk come up into her mouth where her baby bird may drink it."

"Is it like cow's milk?" asked Buddy.

"It is almost like cow's milk except that it has no sugar in it," replied Uncle Jack. Then he continued, "The doves and pigeons are the only birds that make milk for their babies. The old birds eat weed and grass seeds which they find on the ground. Sometimes they

eat the grain in the farmer's field, and the farmer does not like that."

"I never dreamed that the gentle little turtledove was so interesting," remarked Fred, as they continued on their way.

A BIRD THAT IS A BUTCHER

“What bird is that, Uncle Jack?” asked Fred, as he pointed to a bird sitting on a dead branch of a tree.

“It looks like a mocking bird,” said Marylee.

“No, it is not a mocking bird,” replied Uncle Jack. “That is a Shrike. That is a hard name to remember. There is another name for him which I like much better. He is also called a Butcher bird.”

“Why is he called that?” asked Buddy. “A butcher is a man in a meat market. He keeps meat hanging in his ice box until we buy it.”

Uncle Jack smiled as he answered, “Well, Buddy, birds do not sell meat, but this bird does hang his meat up like the butcher does. He catches grasshoppers, beetles, and mice. If he is hungry, he eats them right away. But if he is not, he does not throw them away. He carries them to a thorn bush and hangs them on the thorns. When he gets hungry, he can go back and eat them.”

“Then butcher bird is a very good name for him,” said Bess.

“He is so far away that I cannot see him very well,” said Buddy. “But I think I see a hook on the end of his upper bill.”

“Yes, he does have a sharp hook on the end of his upper bill,” said Uncle Jack. “And he has something

almost like a sharp tooth on that upper bill, too. That sharp hook and tooth help him to tear into pieces the mice and insects that he catches."

"I don't like the butcher bird," said Marylee.

"Watch him turn his head," said Uncle Jack. "He sees something now."

Suddenly the butcher bird left the dead branch. He flew almost to the ground. Then he fluttered his wings fast, but he did not move through the air. He seemed to be looking for something on the ground.

"He saw a grasshopper light on the ground there," said Uncle Jack. "The grasshopper looks so much like the gray earth that the butcher bird cannot always see it easily."

"There, he sees it!" said Buddy, as the butcher bird dropped down on the ground. They saw him trying to catch something. Then he flew up with a grasshopper in his bill. He lit in a bush nearby and seemed to be doing something there.

"Let's see what he is about," said Buddy. "Let's slip up behind the bush and watch him."

"It is a thorn bush," said Marylee, as they came closer to the butcher bird.

"I see the grasshopper on that thorn up there," said Buddy. "The butcher bird did not eat it. He must have hung it up."

"There are two other grasshoppers," whispered Marylee, "and a beetle, too. This must be his regular butcher shop."

The butcher bird heard them and flew away. Then they went up to the bush.

“He has certain bushes where he hangs his meat,” said Uncle Jack. “Then he knows where to find food when he is hungry.”

“Should we call the butcher bird one of our friends?” asked Buddy.

“Yes,” replied Uncle Jack. “He catches very few little birds, but he does catch a great many insects and little animals that are not our friends.”

A FIGHT IN THE AIR

“Look, Marylee, at that beautiful bird on the telephone wire,” called Buddy.

Marylee and the other children came running. “What a long tail he has!” she said. “Uncle Jack, come and see this bird. Did you ever see such a long tail? It looks like a pair of scissors. I wonder if he cuts things with it.”

“I believe that he does,” said Buddy. “He opens and shuts his tail just as if he would like to cut something.”

Uncle Jack, who had just walked up to them, laughed. “His tail does look like scissors,” he told them. “That is the reason this bird has been named the Scissor-tailed Flycatcher. But he does not use his tail for cutting. The long tail helps him to turn quickly, when he is catching insects on the wing.”

“There he goes,” said Marylee, “flying after that big moth. My, how quickly he turns, and see how fast he flies!”

“He caught it!” cried Buddy, as the scissor-tail flew back to the wire, where he ate the moth.

“Why is he called flycatcher, when he catches moths?” asked Bess.

“People used to think that the scissor-tails caught a great many flies; so they called them flycatchers,” replied Uncle Jack. “We know now that they catch moths



and beetles, too, and they seem to like grasshoppers better than anything else. Flycatcher is a very good name, after all, because they do catch things that fly, but most people, now, call them just scissor-tail. Their tails are so long that they can't walk on the ground very fast, but their tails help them greatly in flying. That is why they catch their food in the air instead of on the ground."

"There is another one," said Buddy. "It is not so large as the first one, and it does not have such pretty red feathers under its wings. Could that be Mrs. Scissor-tail?"

"Yes, you're right," replied Uncle Jack. "They may have a nest in one of these small trees."

"Oh, let's see if we can find it," said Marylee.

The children began hunting among the trees for the nest.

"Here it is," shouted Fred, pointing upward.

Uncle Jack and the others hurried up. Buddy climbed up into the small tree to look into the nest.

"There are five eggs here," Buddy called down to them. "They are white with little brown spots all over them."

Marylee wanted to see the eggs, too. She did not wait for Buddy to come down. She climbed up into the tree just as Buddy had.

"Uncle Jack, the nest is made of many things," she said. "There is some grass, and a few stems of weeds. The weed stems have soft balls on them that look like fur."

"Those are bunches of seed from the Poverty Weed," her uncle told her.

"There is some cotton all through the nest, too," Marylee added. "The inside is lined with cotton. These birds like a soft nest, don't they?"

"Yes," Uncle Jack answered. "They are beautiful birds and they have a pretty nest and eggs. You should come down now. The birds don't like to have you so close to their home."

The children climbed down from the tree. When they had gone a little distance from the tree, they saw a hawk flying over it.

"That hawk is hunting for his dinner," said Buddy.

"I do hope he doesn't find Mr. and Mrs. Scissor-tail's nest," said Marylee.

"He had better keep away from those scissor-tails," said Uncle Jack.

They stopped and watched the hawk flying above the tree where the nest was.

"Hawks catch and eat small animals and birds," said Uncle Jack. "But the scissor-tails are not afraid to fight hawks who come too near."

"There they go after the hawk now," said Buddy.

Mother and Father Scissor-tail flew upward at the hawk, screaming as they flew. The hawk was much larger than the scissor-tails, but they did not seem to be afraid of him. Mr. Scissor-tail flew up above the hawk, and then he came down right upon the hawk's back. He held on to the hawk's feathers with his feet and pecked and pecked with his sharp bill. The hawk flew fast,

turning and dipping in the air, trying to throw Mr. Scissor-tail off, but Mr. Scissor-tail hung on and pecked out feathers. Not until the hawk had flown far away from the nest, did Mr. Scissor-tail turn loose. Then he flew back to his nest to which Mrs. Scissor-tail had already returned.

“My, that was a great fight,” laughed Buddy. “I don’t think that hawk will come near the nest of these birds again.”

FATHER VERDIN HAS HIS OWN NEST

The children were again looking in the bushes along the fence for the nest of a harvest mouse.

“I have found one!” said Buddy, as he looked up in a bush that was a little higher than the others. In the branches there hung a big ball of twigs and weed stems built like that which the harvest mouse used for a nest.

“Let’s see if Mother Harvest Mouse is at home,” said Marylee, as she looked for a hole in the side of the ball.

“Here is the door on this side, Marylee,” said Buddy. “I think I saw something in it. I am not sure.”

As Marylee turned around to look into the door, she shook the bush. A little head suddenly appeared in the hole. But it was not that of a mouse. It was the pretty head of a little bird. When he saw the children and Uncle Jack looking at him, he hopped out and flew away.

The children looked at each other in surprise.

“What was a little bird doing in the nest of a harvest mouse,” asked Buddy at last.

Uncle Jack laughed and said, “It does look very much like the nest of a harvest mouse, but that little bird made that nest.”

“Do you think there are any eggs in it, Uncle Jack?” asked Bess.

"No," he replied. "There are no eggs in it. That little bird is Mr. Verdin. He did not build that nest for Mrs. Verdin. He built it for himself, and not for Mrs. Verdin to lay eggs in. He built it so that he would have a quiet place to sleep in at night and to rest in during the day. Alone in his nest, he does not have to listen to crying baby birds. It is also a warm, dry place for him in the winter time."

"Well, how does Mrs. Verdin take care of her babies?" asked Fred. "Doesn't she have a nest for them?"

"Oh, yes. She has a nest somewhere near," said Uncle Jack. "Her nest is like this one, only it is larger. In the bottom is a pocket for the babies so they cannot fall out."

Marylee pushed into the bush so that she was close to the nest. "It is built of little leaves and stems of dried weeds," said she.

"Yes, the verdin uses almost anything that is easy to get to build its nest," said Uncle Jack. "It does one clever thing that very few other birds do. It uses spider webs around the nest to hold it together."

After a little while Marylee said thoughtfully, "We are learning many strange things. We have already found something that had wings and could fly. We thought it was a bird. But you told us it was a mammal, called a bat. Then we thought we had found a bird's nest, but there was a mouse in it with her babies. Now we have found another nest that looks like the nest of a mouse, but it belongs to a father bird."

"Marylee does not know what to believe," said Uncle Jack, as he laughed and patted her on the shoulder. "You



never know what you will find when you are hunting for Nature's treasures. She keeps you thinking all the time. That is why I like to go with you on treasure hunts."

"I think I can tell the difference between the nest of a harvest mouse and that of a verdin the next time I see one," said Buddy, as they walked away.

HONK! HONK! HONK!

“Honk! Honk! Honk!” Buddy and Marylee heard this strange sound as they sat in the yard with Uncle Jack.

“Honk! Honk! Honk!” It sounded a long way off, but it was coming closer. Buddy and Marylee looked all around, but they could see nothing. Then they saw Uncle Jack laughing.

“Why are you laughing?” asked Marylee.

“Because you are not looking in the right place,” said Uncle Jack. “You should look up into the sky.”

“Honk! Honk! Honk!” They heard it again, and this time it was much nearer.

“It’s somewhere up in the air,” said Marylee.

“I never heard an airplane sound like that,” said Buddy. “Look, I see something in the bright part of the sky yonder. It looks just like a number of airplanes flying together in a V shape. But they can’t be airplanes.

“You are right, Buddy,” said Uncle Jack. “They are not airplanes. They are wild geese.”

“Are they coming south for the winter?” asked Buddy.

“That is just what they are doing,” replied Uncle Jack. “They always make a big V in the sky when several of them fly together.”

“Isn’t it interesting that wild geese and other birds come south to spend the winter?” said Marylee.

“Do the geese go very far north during the summer, Uncle Jack?” asked Buddy.



“They nest up in Canada,” was the reply, “where there are many lakes. When the baby geese hatch, they can go swimming every day in fresh clean water.”

“I would like to fly along through the air as they are doing,” said Buddy. “It would be great fun to look down and see houses, trees, rivers, and other things. I would like to live up in Canada a part of the year, and by the Gulf of Mexico the rest of the year.”

“But how do they find their way so far?” asked Marylee.

“See the one in the front,” said Uncle Jack. “That is their leader. He is a wise old gander who has made the trip before. He knows the country and guides them by day and by night with his honking call. But if the clouds get too thick and low, he may lose his way. Then the geese become frightened and will come down to the ground. Sometimes they get so frightened that they fly against something and hurt themselves. Let me tell you a true story about a wild goose.

“One winter he was flying south with his companions. He had reached Texas. Then one day he was hurt. He came down near a farmer’s house where there were some tame geese. The tame geese took him in as one of them. He stayed all that year with the farmer’s flock. His hurt wing healed. One day the next winter, he heard in the air the honk, honk, of the wild geese from Canada flying south again. He remembered his old free life. He forgot his new friends, rose on his wings, and flew off with the flying flock.”

FROM SEED TO TREE

*Consider the lilies how they grow;
they toil not, neither do they spin.*

THE BIBLE

FLOWERS AND THEIR FRIENDS

“Uncle Jack, please come out and see how beautiful the flowers are this morning,” begged Marylee, when she found Uncle Jack in the house. “The rain we had last evening has made the plants grow new flowers.”

“Certainly, I will come,” replied Uncle Jack. “I always enjoy the fresh flowers that come after a rain. Perhaps Fred and Bess would like to go with us. You might telephone and ask them.”

“And I will ask Mother for a lunch to take with us,” added Marylee, as she ran to the telephone.

Mother had the lunch ready by the time Bess and Fred arrived.

They left the house and walked to the edge of the woods where Buddy was picking some flowers for Mother. Buddy saw them coming and called, “Isn’t this a fine bunch? See how many different colors I have! Here is a yellow one. Here is another yellow one with a brown center. Here are red ones, and blue ones, and blue and white ones. Here is a dark yellow and there is a lemon yellow. And I have some pink ones and some pure white ones.”

“Why are there so many colors?” asked Marylee.

“Flowers have different colors so that their friends

can tell them apart," Uncle Jack explained. "Can you tell me who are the friends of the flowers?"

"We are friends of the flowers," Buddy replied slowly as if he were thinking. "But I don't believe you mean us. Perhaps, you mean the bees are friends of the flowers."

"Yes, I did mean the bees," agreed Uncle Jack. "Bees are friends of the flowers and the flowers are friends of the bees. You can hear the gentle humming of the bees, as they go from flower to flower, and the flowers seem to nod their heads to the bees in a very friendly way."

"Mother told us that bees find honey, which she called nectar, in the flowers," said Marylee. "The bees must be happy when the flowers give them so much sweets. What do the bees give the flowers in return?"

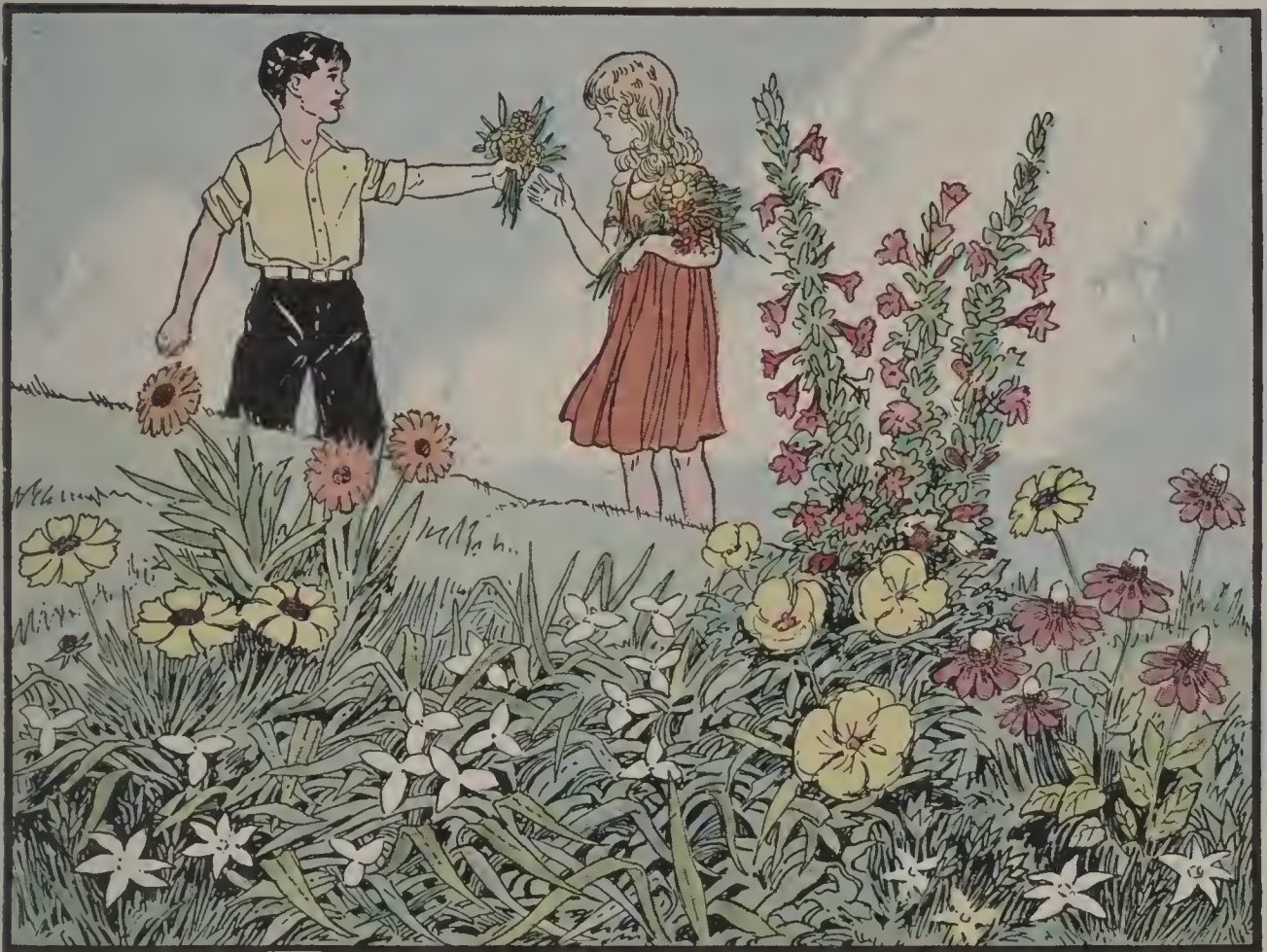
"The bees help the baby seeds of the flowers to grow," replied Uncle Jack.

"The bees stay such a little while on the flowers, how can they help the seeds?" asked Fred.

"You have both seen pollen, which is the yellow dust in the flowers," Uncle Jack explained. "The tiny seeds in the bottom of each flower must have some of this pollen before they can ripen. If they do not have this pollen at the right time, they will die."

"The pollen is right there in the flower," Bess said.

"The pollen of many flowers will not make their own seeds grow," replied Uncle Jack. "The baby seeds of one flower must have pollen from another flower of the same kind."



“Now, I know how the bees help the flowers,” cried Marylee. “They get pollen all over their fuzzy legs when they are after nectar in a flower. Then they carry that pollen to the next flower. Some of the pollen rubs off for the baby seeds there. I have seen bees with so much yellow dust on them that they looked like powder puffs. But I didn’t know that was the way they paid for their honey.”

“That is right,” continued Uncle Jack. “But the pollen from a buttercup would not be of any use to the seeds of the violet. A bee finds only a tiny bit of nectar in each flower; so it must visit many flowers before it

has enough nectar to carry back to the hive. If the first flower which it visits when it starts to gather a load of nectar is a buttercup, then it continues to go from one buttercup to another. So the buttercup pollen is not wasted on flowers which cannot use it."

"How does the bee know a buttercup when it sees it?" Buddy asked.

"How do you know a buttercup when you see it?" Uncle Jack, smilingly, asked in reply.

Buddy did not answer until he thought for a little while. He knew that the bright yellow color of the flowers helped him to find them and know that they were buttercups. He also knew that there are flowers which are yellow, but they are not the shape and size of buttercups. He finally replied, "The color of the buttercups helps me to know that they are buttercups, but I might make a mistake if they were like some other flowers in size and shape."

"That is probably the way the bees know them," Uncle Jack added.

"But there are some flowers that are so small and have such little color you can hardly see them," Marylee objected.

"That is true," Uncle Jack agreed, "but most of those flowers have a strong perfume instead of large size and bright colors. The perfume helps the bees to find and know them."

"I think it is very wonderful the way the flowers coax the bees to help them to get the pollen for their baby seeds," Marylee said thoughtfully.

UNDER A LIVE OAK TREE

“Who wants some lunch now?” called Uncle Jack.

“I do! I do! I do!” cried the children, as they came running toward him.

Noon had found them near the edge of the woods. They carried the lunch over to a big live oak tree where the grass was smooth and clean. Soon they were busy eating.

Fred, looking up at the tree, said, “I would like to know why this tree is called a live oak.”

“It is called live oak because it is always alive,” said Buddy, as he took another bite of sandwich.

“That can’t be the reason, because all oaks are alive,” replied Fred.

“Buddy was almost right,” said Uncle Jack. “This is the only kind of oak that keeps its leaves all winter. It stays green when all the other oak trees are bare and look dead. It is the only kind that looks alive in the winter; so it is called live oak.”

“Does it keep the same leaves forever?” asked Bess.

“Oh, no. It drops its leaves and gets new ones every year,” said Uncle Jack.

“How can it drop its leaves and still stay green all the time?” asked Fred. “There must be something funny about that.”

Uncle Jack laughed and said, "There is something unusual about it, Fred. I will tell you the live oak's secret. The live oak does not drop its leaves in the fall like the other trees. It keeps them until spring. As fast as old leaves drop off, the new leaves grow out. Soon the live oak has a beautiful new dress, and few persons know how or when it got it."

"Here are some of the acorns in their pretty little cups," said Marylee, who had finished her lunch and was looking around to see what she could find. "Are they good to eat?"

"The acorns of many oak trees are bitter and not at all good to eat," replied her uncle. "But these acorns are not sour or bitter. The Indians used to eat them. They might taste good to me, if I were very hungry. They are rather dry. They taste better when roasted."

Fred, tasting one, said, "Whew! I don't like acorns."

Buddy tried one. "I don't like them, either," he said.

"Maybe one could learn to like them," added Marylee.

"I'm thankful we don't have to eat them," said Fred.

"Is a tree like this very old, Uncle Jack?" asked Bess.

"Yes, Bess," answered Uncle Jack. "It takes many years for an oak to grow as large as this one. It is much older than your grandfather. It was growing here when the Indians lived in this country."

"Do you think that the Indians ever sat where we are sitting now?" asked Bess.

"They may have sat under this very tree," replied Uncle Jack. "The Indian girls and boys may have picked up acorns here just as you are doing."

"I wish I knew how old this tree is," said Fred.

"It is very hard to tell how old a tree is while it is standing," answered Uncle Jack. "But after it is cut down, you can tell. You can tell, also, which years had much rain and which years had very little."

"Do show us how you can tell, Uncle Jack," begged Bess.

"Let us go to that stump yonder and see if we can read the age of that tree when it was cut down," said Uncle Jack.

They went over to the stump.

"See these rings in the wood," said Uncle Jack. "It took the tree a whole year to make one of these rings. Each year the tree puts on a new layer of wood just under the bark. That layer is the ring you see. Now count the rings. Then we shall know how old the tree was."

They tried to count the rings, but it was a little hard to do, because some of the rings were so close together. They counted twenty rings.

"That means that the tree was twenty years old," said Buddy. "But, Uncle Jack, why are some of the rings so wide and some of them so narrow and close together?"

"When the ground was very dry, the tree did not grow so much and this layer of new wood which you see is not so thick," replied Uncle Jack. "Here is a wide ring. There was much rain that year and the tree grew all of that new wood. The next year was very dry. The tree grew only this little narrow belt of wood."

"You can look at the end of a branch that has been cut off and tell the age of the branch," continued Uncle

Jack. "It, too, grows a new layer of wood every year. These layers show as a ring in the end of the branch when it is cut. Count the rings and you know how old the branch is."

BUDDY FIGHTS A WEED

Buddy, seeing a beautiful yellow and black butterfly, ran to catch it. The children saw him run a little way and stop. He ran back as fast as he could, crying, "Ouch! Ouch!" He picked up a big stick, and began to beat some weeds.

"What can he be doing?" asked Bess.

"Maybe a snake bit him," said Fred.

They ran to Buddy. They heard him talking, in such an angry tone, to the weeds. "There, take that, and that, and that," he said as he pounded the weeds. "I'll teach you not to sting my legs like a bunch of wasps when I didn't intend to hurt you. I'm going to break every one of you before I stop!"

"Buddy! Buddy!" called Uncle Jack. "You must not let weeds make you so angry. Hold your temper as a man should."

"Just look at my legs, Uncle Jack," said Buddy, as he stopped pounding the weeds. "See how red they are. They look as if they had been burned, and they feel like it, too."

"Yes, I know they hurt," said Uncle Jack. "But you must not blame the weeds. Come and sit down while I tell you about them."

"I wish that I had some water to put on my legs. It would feel nice and cool," said Buddy.

"No, Buddy. Water would make your legs burn more," said Uncle Jack. "It is also better not to rub them."

"What makes them sting?" asked Buddy.

"Those weeds are nettles," answered Uncle Jack. "They have hairs all over their leaves and stems. Each hair is sharp like a tiny needle. It has a hole through its center. At the bottom of each hair there is a tiny sac of poison. This sac is just under the skin of the leaf and so little that you cannot see it. The hair is so sharp that it sticks into your skin when you touch it. Then the poison flows into your skin through the hole in the hair. That poison makes your skin hurt."

"Why do they have such hairs, Uncle Jack?" asked Bess. "I don't think they are friendly plants."

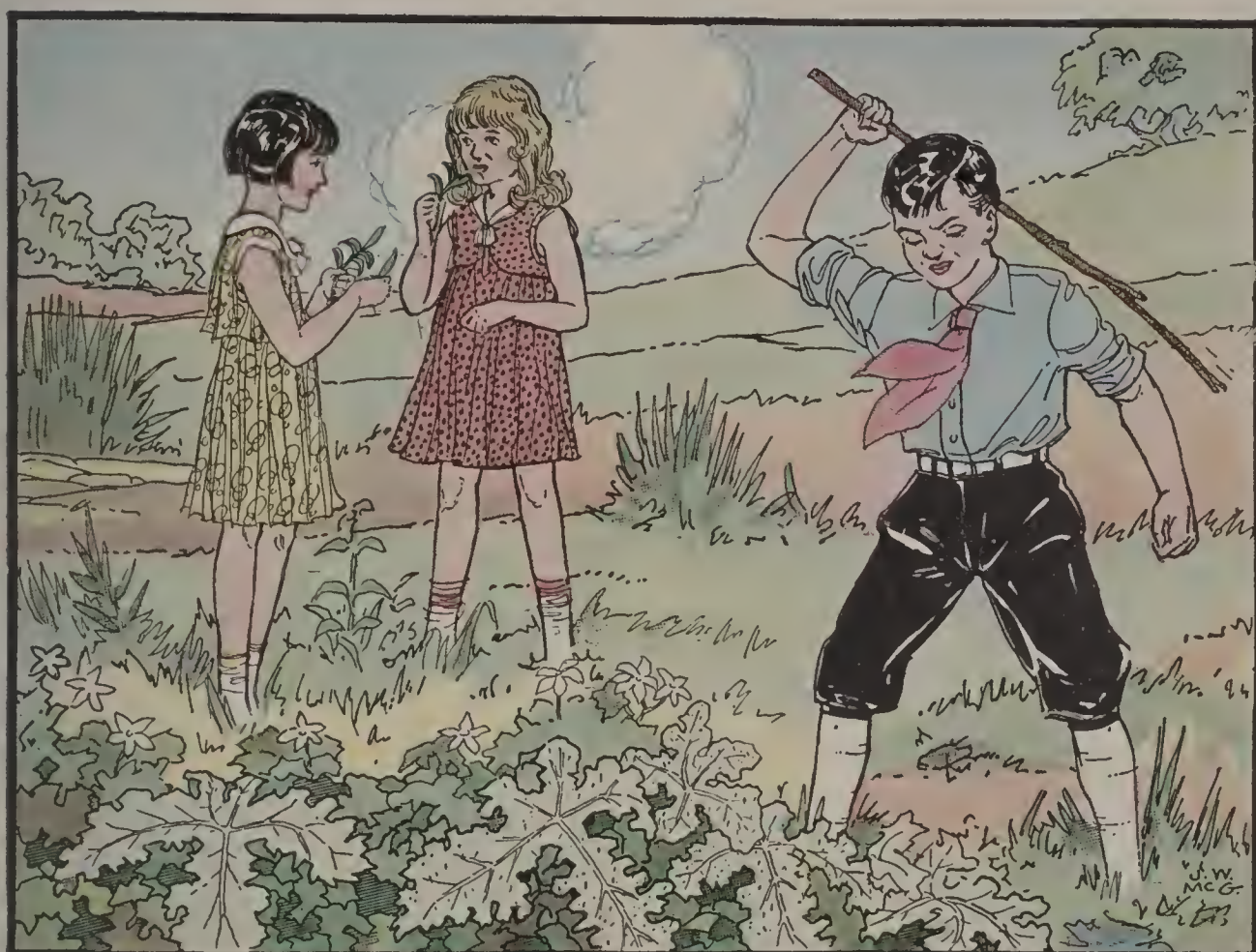
"Those weeds do not want to be friendly," laughed Uncle Jack. "They grow the poison so animals will leave them alone. You can see how all the weeds around us are eaten off except the nettles."

"There are some weeds in that low wet place over there that the cows have not eaten. Are they nettles, too?" asked Marylee.

"No, that is a different weed," replied Uncle Jack. "It is colored a much brighter green, and it is called smart weed."

"Is it called smart weed because it knows so much?" asked Bess.

"Oh, no! That is not the reason," laughed Uncle Jack.



“Fred, if you will get me a little piece of one of the plants, I shall show you why it gets its name.”

Fred picked a piece of a plant and gave it to Uncle Jack.

“Now, see the sap comes out,” Uncle Jack said as he broke one of the leaves. “The sap of the smart weed does not taste good. It smarts or burns when you get some in your mouth. If you get very much in your mouth, it hurts. The cows soon learn to leave it alone. Fred, are you brave enough to taste a very little bit of the sap, if I do?”

“Yes,” answered Fred. The others then tasted a lit-

tle, too. It did not burn much, but they did not want to try it again.

“Plants can’t run away from their enemies, and they don’t have mouths with teeth,” said Uncle Jack. “They have to fight some other way. Some have stingers like the nettles. Some have bad-tasting sap. Others have thorns, and a few are very poisonous. We may find all of these kinds while we are looking for treasures.”

“I shall try not to be angry the next time plants sting me,” promised Buddy. “I shall remember that it is their way of keeping things from hurting them.”

“That is right, Buddy,” said Uncle Jack. “It is much better to know the plants which will hurt you, and then not touch them.”

HOW SEEDS TRAVEL

“Uncle Jack, look at that cow,” called Fred, as he pointed to one standing in the brush. “The end of her tail looks like a ball.”

“She has been walking through a patch of cocklebur plants,” replied Uncle Jack. “Some of the burs caught hold of her tail, and now they are taking a ride.”

“How can they hold on to her tail?” asked Bess.

“Some seeds have a shell around them, and on the outside of that shell are many stickers or spines. These shells are called burs,” explained Uncle Jack. “Each spine of the cocklebur has a hook at the end. The hooks catch in the long hair of animals, and the burs get a free ride.”

“Why do they want to go for a ride?” asked Buddy.

“Plants make a great many seeds,” Uncle Jack replied. “If all of those seeds dropped on the ground near the mother plants, the young plants would be so close together that there would not be enough food in the soil for them to eat. They would soon die. So some of the seeds must find other places to grow. They cannot walk; they have to travel some other way. They might get into the hair of a dog, a horse, a sheep, or a wolf. They might even catch on your trousers, Buddy, if you happened to touch some of them.”

“There are many different kinds of burs,” continued Uncle Jack. “There are some tiny flat burs called stick-tights, because they stick to your clothes so tightly that it is hard to get them off. Then there are some with only two spines, which are so long they make the bur look like a fork.”

“How do seeds that are not in burs travel?” asked Buddy.

“Some of them are carried away by the birds. Others float away on the water when it rains. And some fly through the air. Each seed of the cottonwood tree has fastened to it a little fluffy silk, like a sail, so that the wind can blow it a long way.”

“I know another kind that flies through the air,” said Marylee.

“What kind?” asked Buddy.

“The dandelion,” replied his sister. “Each seed has a little bunch of white hairs on one end of it. It’s fun to blow the seeds and watch them float away like tiny balloons.”

“It may be fun to blow those seeds,” said Buddy, “but it isn’t fun to taste the bitter milk in the stems of the dandelion.”

“The dandelion does not want the cows or horses to eat it before its seeds have a chance to sail away,” said Uncle Jack. “That is why the milk, or sap, in its stem is bitter.”

“Are there any other ways that seeds travel?” asked Fred.



“Yes, some plants grow their seeds in pods,” Uncle Jack answered. “When the seeds are ripe, the pods pop open and scatter them. They do not go as far as the ones with sails, but the wind carried them a little way. There are still other ways that seeds travel. But I shall tell you about them some other time.”

WHAT IS A POTATO?

“Who wants to help get supper ready?” called Mother, as Uncle Jack and the children came in from their walk.

“I do,” said Marylee.

“How can we help?” asked Buddy.

“Marylee, you may put the dishes on the table,” replied Mother. “Buddy may get the potatoes ready to cook.”

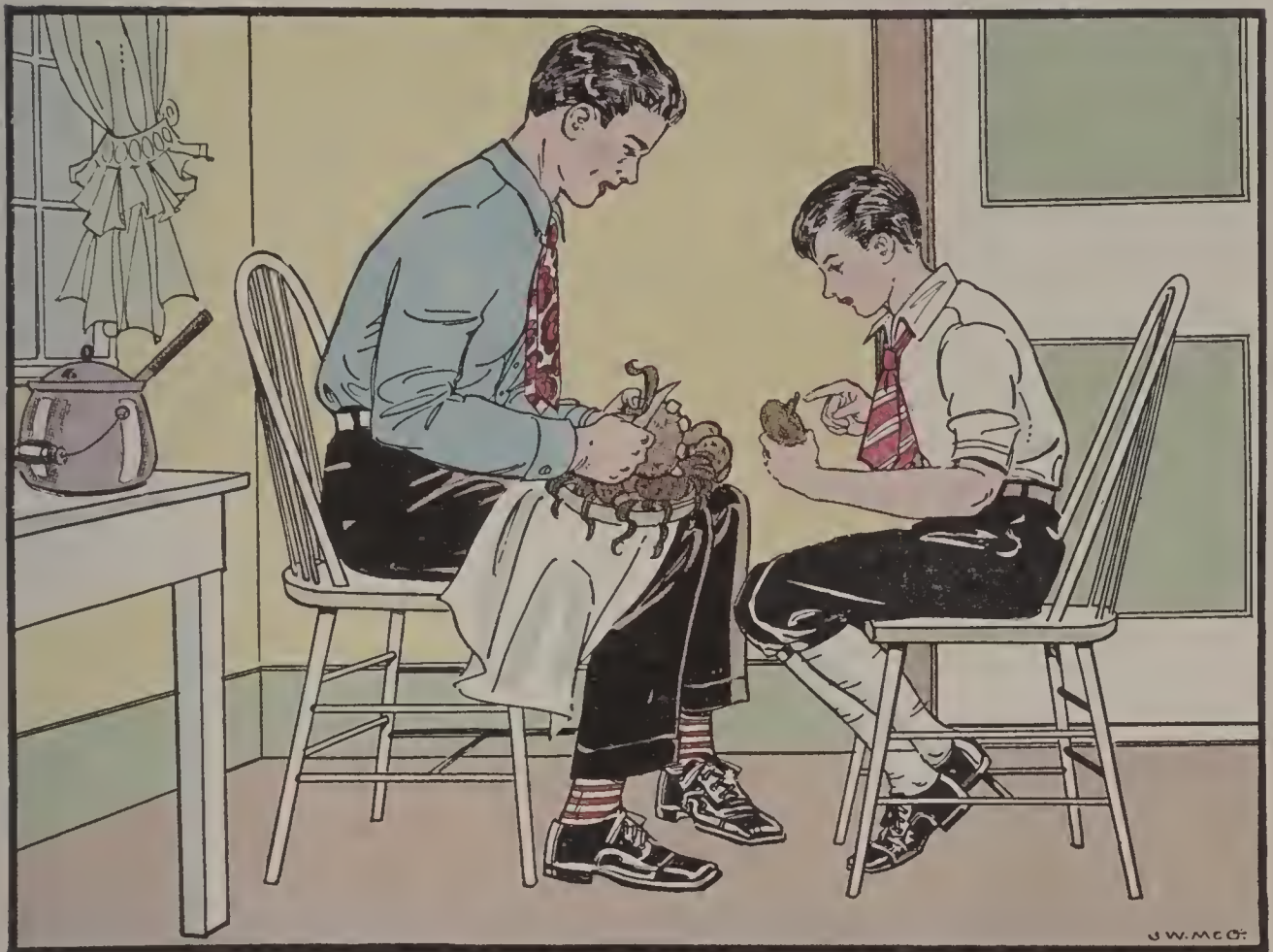
“I shall help Buddy,” said Uncle Jack. “I am a good potato peeler.”

Buddy ran and brought the potatoes. They sat down to peel them.

“What is a potato, Uncle Jack?” asked Buddy. “Is it called a fruit, like a peach or an apple?”

“No,” he replied. “It is only a branch that grows under the ground, instead of growing above the ground as most branches do. The branch is small at first. The potato plant makes food and stores it in the little branch under the ground. The branch grows larger and larger as the plant puts more and more food into it. In a few weeks, the little branch becomes a big, fat potato.”

“Why does the plant put food into a branch under the ground?” asked Buddy. “Does it do this so that we may have potatoes to eat?”



“The potato plant is not thinking about us,” said Uncle Jack. “It puts the food there for its own babies to eat next year. The plant does not live long. When the potato is full grown, the plant begins to die. Those little spots on the potato, which you call eyes, are really buds. They are very much like the buds on branches that grow above the ground. In the spring baby potato plants grow from those eyes, or buds. While these plants are growing, they eat the food that the mother plant stored in the potato for them.”

“Here is a baby plant starting to grow from an eye,” said Buddy.

“Yes, each eye, or bud, can make a new plant,” said Uncle Jack. “When we plant potatoes, we do not plant potato seeds. We plant potato pieces which have some buds on them.”

“Everything is interesting when you know about it, isn't it, Uncle Jack?” asked Buddy.

“Yes, that is true,” he replied. “Now the potatoes are peeled and ready to cook.”

“Thank you very much,” said Mother.

FROM SAP TO SUGAR

“Uncle Jack, please pass the sugar,” said Buddy, while they were eating supper.

“Do you know what sugar is, Buddy?” asked Uncle Jack, as he passed it to him.

“I know that sugar is sweet,” replied Buddy.

“Yes,” said Uncle Jack. “But where does it come from?”

“This sugar came from the store, didn’t it, Mother?” answered Buddy.

They laughed at Buddy’s answer. Then Marylee said, “Everyone knows that we get sugar from the store, stupid! Uncle Jack asked if you knew where it came from first.”

“I don’t know where the store gets it,” replied Buddy. “I know that they don’t get it out of the ocean, because the ocean water is salty.”

“Please tell us where sugar does come from, Uncle Jack,” begged Marylee.

“Most sugar is made from the sweet sap of sugar cane plants,” replied Uncle Jack. “It is so sweet that children who live where the sugar cane grows like to chew the stems of the plants and suck out the juice.”

“How do they get the sap out of the stems to make sugar?” asked Buddy.

“They cut off the stems close to the ground with big knives,” answered Uncle Jack. “Then they carry the stems to a machine which squeezes out the juice. The machine is much like Mother’s clothes-wringer, but much larger. It squeezes out the juice of the cane stalks just like a wringer squeezes the water out of clothes. The sap looks like water at first, and much of it is water. Then it is put into great kettles and boiled slowly. The water goes off in steam and leaves the sugar in the bottom of the kettle.”

“That is just what happens when you boil salt water,” said Marylee. “We did that. The salt was left in the bottom of the pan when the water was all gone.”

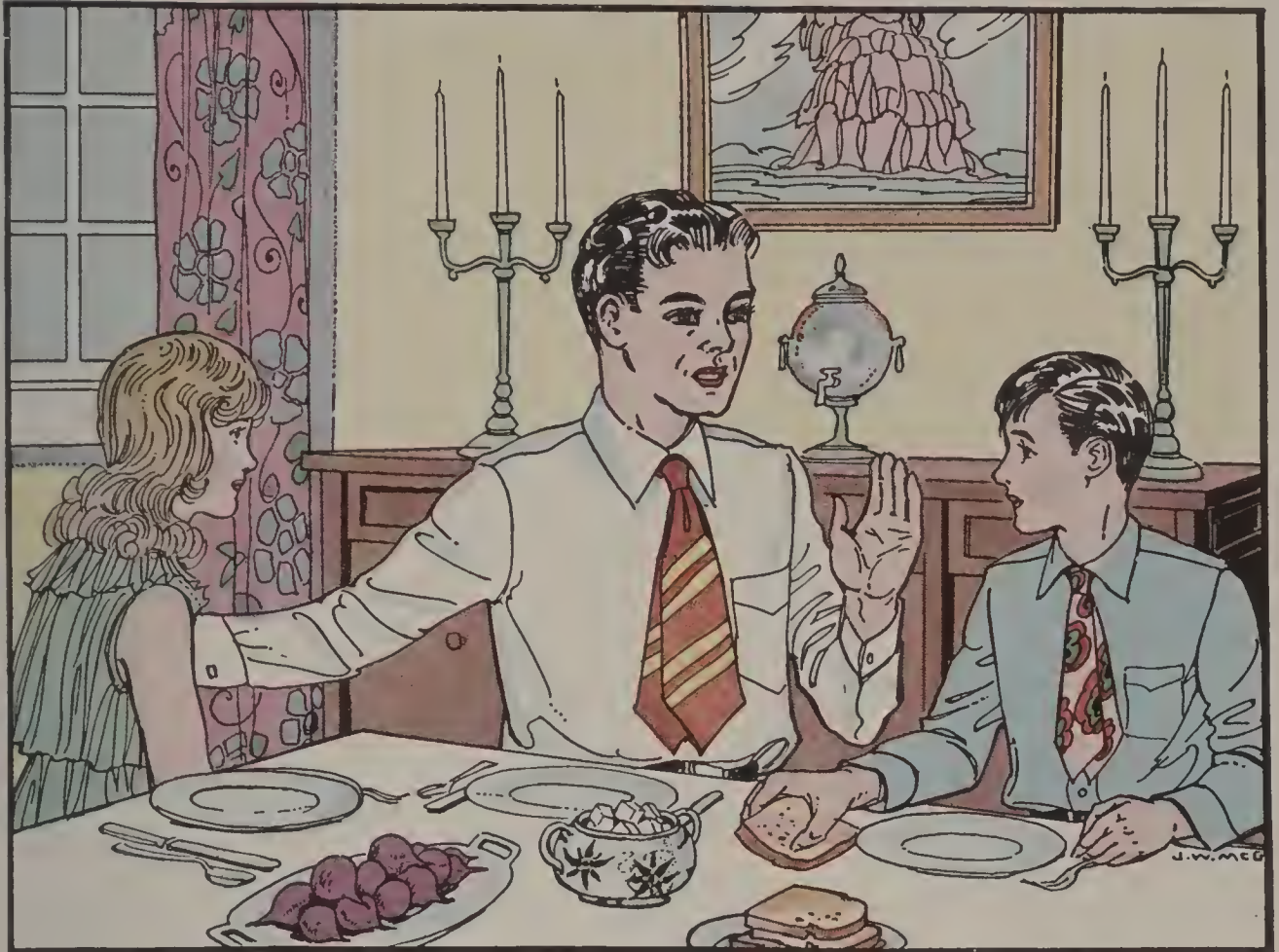
“The sugar is not pretty and white when it first comes from the mill,” continued Uncle Jack. “It is brown like the sugar that Mother sometimes gets to use in her cooking. The brown sugar is sent to a refinery, which is a place where it is made clean and white as you see it now.”

“Does all sugar come from sugar cane?” asked Buddy.

“No, a large part of our sugar is made from the sap of sugar beets,” replied Uncle Jack.

“Do you mean from beets like those we have for dinner?” asked Marylee.

“Yes, it is made from beets that are very much like



those we eat. But the sugar beets are much larger and sweeter," he answered.

A DRESS MADE OF WOOD

"I have your new party dress finished, Marylee," called Mother, from the back room.

"Goody, goody," said Marylee, as she went to Mother. "May I put it on now, so that Uncle Jack can see how pretty it is?"

"Yes," replied Mother.

Marylee went back to the library to show the new dress to her uncle.

"That is a pretty dress," Uncle Jack said when he saw it.

"It is silk, too, isn't it, Mother?" asked Marylee.

"It does look like silk," replied Mother, "but it is not. It is called rayon."

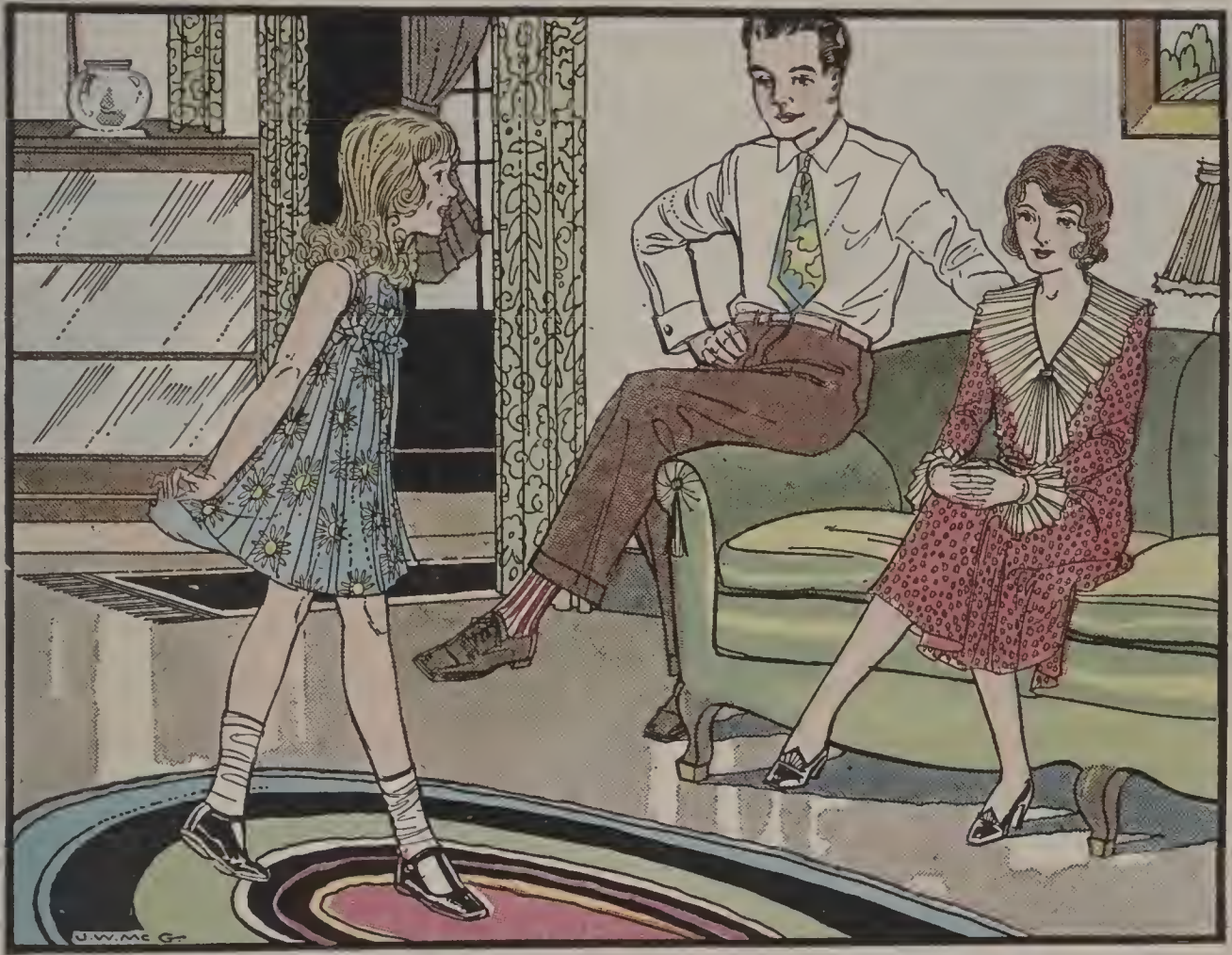
"What is rayon?" asked Buddy.

"Perhaps your Uncle Jack can tell you about it," replied Mother.

"Your dress is probably made of wood," said Uncle Jack. Then he laughed to see how surprised Marylee and Buddy were.

"How can it be made of wood?" asked Marylee. "It is shiny, soft, and as pretty as silk. Silk is not made of wood, is it? It doesn't look like wood, and it doesn't feel hard like wood."

"Silk is made from the leaves of trees," said Uncle



Jack. "There is a caterpillar called the silkworm that eats the leaves of the mulberry tree, and then spins a cocoon of silk. Men get the silk to make cloth by unwinding the threads of the cocoon. So silk is really made from the leaves of trees."

"Is the cocoon of the silkworm like the cocoon made by the *Cecropia* caterpillar?" asked Buddy.

"Yes, they are very much alike," said Uncle Jack. "The *Cecropia* cocoon is larger, but the threads in it are not so strong as those the silkworm makes for its cocoon."

“Rayon,” continued Uncle Jack, “is not made from the silk of caterpillars, but from the wood of trees. Men grind up very fine some certain kinds of wood into what is called pulp. Then they mix other things with the pulp, and cook them all together until it is sticky like glue. This sticky stuff is squeezed through tiny holes, so that it makes long threads that look like silk. The thread is then colored and made into cloth, like that in your pretty dress, Marylee.”

“Then, I am really wearing a dress made of wood,” said Marylee.

“You may be, but that is not certain,” replied Uncle Jack. “Cheap cotton is also used to make rayon. I cannot tell by looking at the rayon whether it was made of cotton or of wood.”

“I am going to play that my dress is made of wood,” said Marylee. “I think that is more fun.”

“Do they make cloth out of anything else besides cotton and silk and wood, Uncle Jack?” asked Buddy.

“Oh, yes, they use several other things in making different kinds of cloth,” replied Uncle Jack. “You will learn about them later.”

BITS OF ROCK AND DROPS OF WATER

Nature speaks in symbols and in signs.

J. G. WHITTIER

DISHES OF CLAY

“See how this dirt is falling down from the bank,” said Buddy, one day when all the children and Uncle Jack were walking along the creek.

“I don’t like to hear you call that dirt,” remarked Uncle Jack. “It is better to call it soil, or earth. Soil only becomes dirt when it is where it should not be, on your face or in the house. But we could not live without the soil. There would be no flowers, no trees, no animals, no people.”

“I never thought of that before,” said Buddy. “But, Uncle Jack, what makes this yellow earth fall down in hard little pieces?”

“That is clay. It is a kind of soil that, when it gets dry, becomes very hard. There are some pieces that have rolled into the water. See if they are hard, also.”

Bess picked up some of the pieces and squeezed them in her hand.

“Oh, they are soft!” she cried. “Won’t they make beautiful play dishes?”

So Marylee and Bess began to make some little cups, saucers, and plates. Fred tried to make a boat, and Buddy rolled some into marbles.

“The Indians made their real dishes of clay,” continued Uncle Jack. “They mixed a little very fine sand

into the clay to keep it from cracking so easily. They baked the dishes in the fire to make them strong. Then they painted them with pretty colors, something like our dishes.”

“Mother has some beautiful dishes,” said Fred, “but most of them are white.”

“Those dishes are made of white clay,” explained Uncle Jack. “They are made by machinery and baked in great ovens that are very, very hot. Sometimes other things are put with the clay to make the dishes stronger.”

“Is anything else made of clay?” asked Fred.

“Bricks are made of clay mixed with a little sand and put into a mold. Then the bricks are placed in big ovens and baked, also.”

“The clay that Mother’s dishes are made of isn’t like the soil in our garden, though,” said Fred.

“Dishes are made of rock flour,” continued Uncle Jack. The children looked at Uncle Jack in surprise.

“What do you mean by rock flour?” asked Fred. “Rocks are hard, and this wet clay is soft.”

“Grains of wheat are hard, aren’t they?” asked Uncle Jack.

“Yes,” answered Fred.

“But when the flour made by grinding that wheat is mixed with water, it is soft, very much like this wet clay,” explained Uncle Jack. “When a certain kind of rock called feldspar is ground up like flour, we say it is clay, but it is really rock flour.”

“How do the feldspar rocks get ground up?” asked Bess.



“Some are ground up when they come tumbling down the creek. Tiny pieces break off of rocks that stick out of the ground very much the same way that little pieces of wood come off old logs. It takes a long, long time, but after a while the rocks turn to flour, and so we find clay. But, when men want white clay, they don't wait so long. They take the feldspar rocks and grind them in mills until they are very, very fine. Then they make dishes of this flour. That is how they get most of the clay from which our pretty dishes are made.”

“I didn't know that there were so many interesting things about clay,” said Fred.

STORIES WRITTEN ON ROCKS

“Uncle Jack, here is a flat rock with something on it,” said Buddy. “It looks like the picture of a big snail.”

“You are right,” replied his uncle. “That is the picture of a snail, and it tells a story of long, long ago.”

“Please tell us the story,” begged Marylee.

“Let us sit down and I will,” said Uncle Jack.

“It was long, long ago, when the earth was much younger than it is now,” he began.

“Was it when you were a little boy?” asked Bess.

Uncle Jack laughed and replied, “It was a long, long time before I was a little boy. It was many, many years before your great-grandfather’s great-grandfather was a little boy.”

“That was a long time ago,” said Marylee. “Well, what happened?”

“In those days the ocean covered the ground where we are now sitting,” continued Uncle Jack.

“Do you mean that we are sitting where there was once an ocean bottom?” asked Fred. “Did fish and whales swim around right here?”

Marylee’s eyes were wide open in surprise at what Uncle Jack had said.

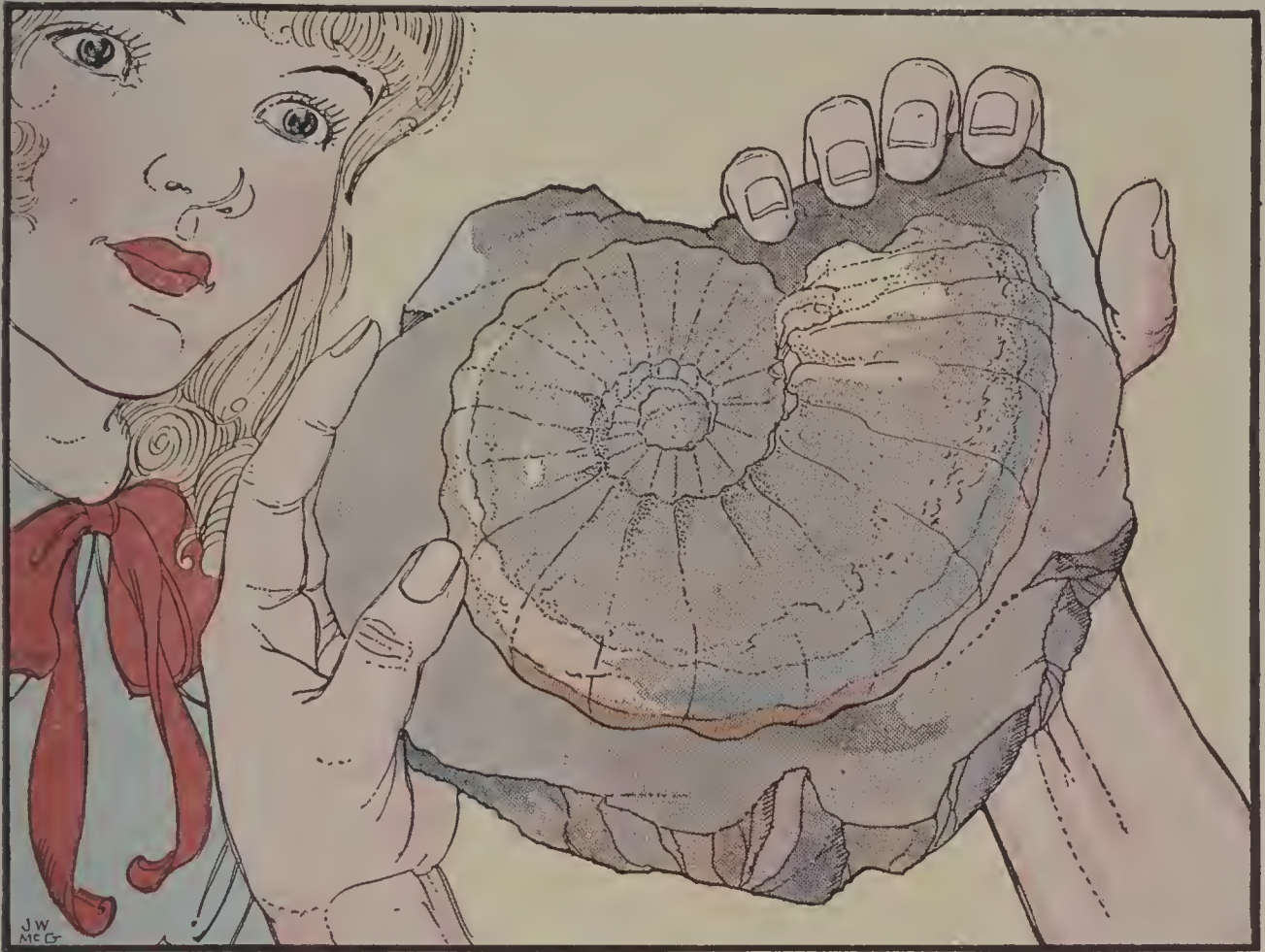
“Yes,” continued Uncle Jack, “that was when this snail was alive. This kind of snail lived only in the ocean. Wherever you find their pictures in the rocks, you may be sure that the ocean was there a long, long time ago.”

“I don’t see how their pictures could get in the rocks,” said Buddy.

“This rock was soft when the snail was alive,” explained Uncle Jack. “The snail died and its shell lay on the bottom of the ocean. The shell became covered with sand and mud. Slowly the sand and mud became harder and harder. Mud squeezed inside of the shell, and that became hard, too. Now, you can see just where the shell was, and what it looked like.”

“This must have been a big snail,” said Buddy. “I never saw one alive the size of this one. It would cover your hand.”

Uncle Jack continued, “There were many large creatures living on the land and in the water then. Some of the animals were very much larger than elephants. Some of the snails were as big as a large head of cabbage. People find the pictures of many birds, insects, fish, plants, and trees pressed into the rocks. Sometimes the real bones of animals that lived then are found. These rock pictures and bones are called fossils, and they tell us stories of what the earth was like when they were alive. Men dig them out of the rocks and put them in show places called museums. We can go to museums and



read many stories about what the earth looked like before there were men to write stories in books.”

“Some day I’m going to learn all about fossils,” said Buddy. “They must tell lots of interesting things.”

“Let’s keep this fossil as one of our treasures,” said Marylee.

WATER FLOATING IN THE AIR

“I am glad that you came home before it started to rain,” said Mother, as Uncle Jack and the children ran to the porch.

Uncle Jack sat down in a porch chair before he spoke. “We did not care to get wet; so we hurried home. But I always like to watch it rain, because everything seems so clean and fresh after it is over. The rain gives the plants a drink of water; so they can grow and make more beautiful flowers. It gives the trees and the grass a bath; so they are brighter and greener. Even the birds seem to sing more happily after a rain.”

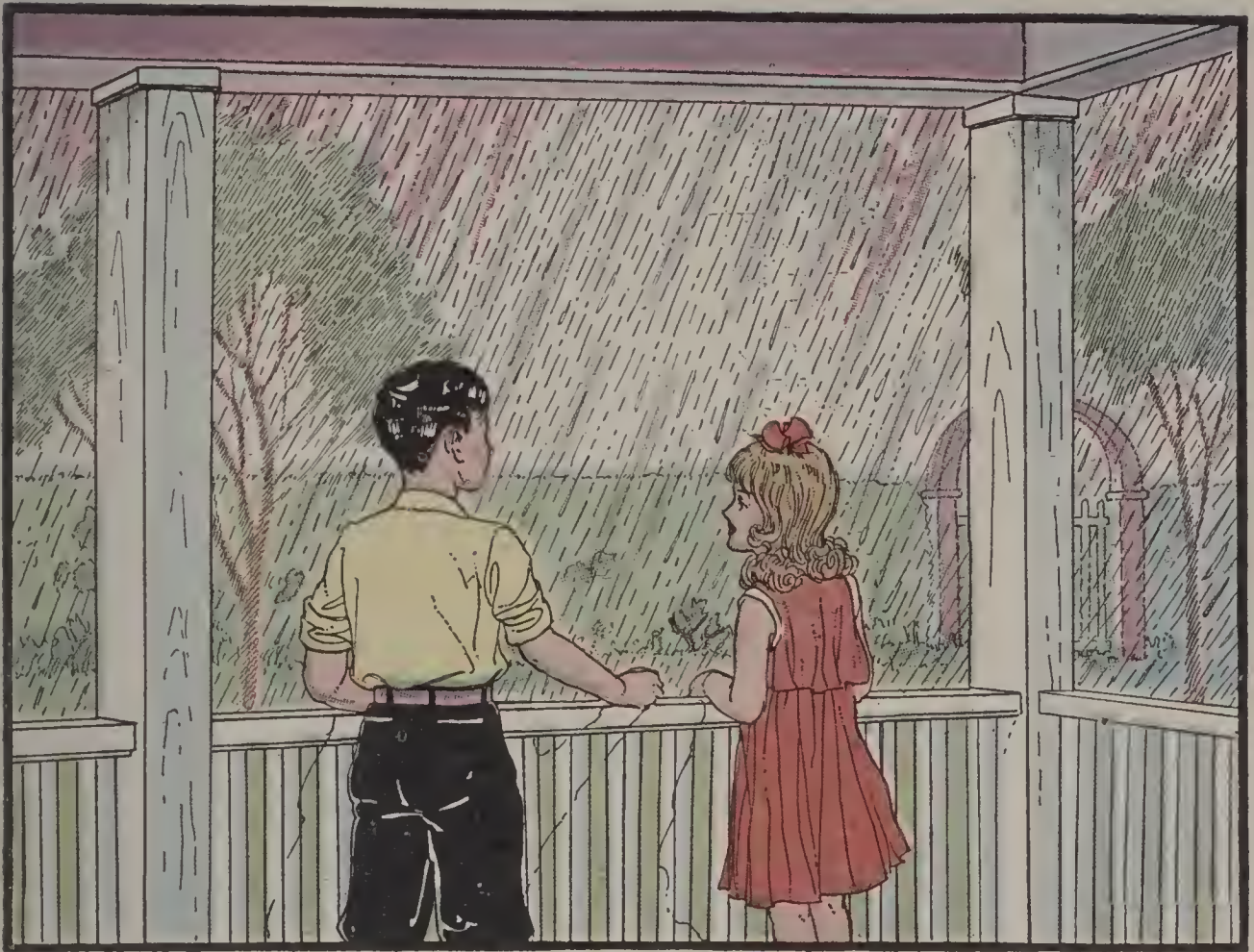
“There comes the rain now,” cried Buddy, as the drops began to fall.

The drops of rain came down faster and faster. They splashed in the yard. They fell on the roof and made a great racket. Water poured off the house and ran down the path. Soon everything was very wet.

“What makes it rain, Uncle Jack?” asked Marylee. “Is the water on top of the cloud like water in a dish? And does it spill over the sides, or leak through the bottom so that it falls on us?”

“No, Marylee, the cloud is not like a dish of water,” Uncle Jack replied, smiling. “The cloud itself is water.”

“If the cloud is water, how does it stay up in the air?”



asked Buddy. "When I throw water up into the air, it always comes down again."

"Before I answer your question, Buddy, I shall ask you and Marylee one. Do either of you know what steam is?"

"I know what it is," answered Marylee. "It is water that comes from the spout of the teakettle when the water in it is boiling. The steam floats in the air like smoke. When it was cold in the kitchen last winter, steam floated up to the top of the room and looked like a little cloud up there. Was that like the real clouds we see up in the sky?"

“Yes, a real cloud is very much like the one you saw in the kitchen,” Uncle Jack replied. “Of course, the real clouds do not come out of a teakettle. The air has tiny drops of water in it all the time. The drops are so very small that you cannot see them. Air that is hot can hold much more water than cold air can. The air inside of the teakettle is very hot, so that it holds a great deal of water; but the hot air becomes cooler when it comes out of the teakettle. The cool air will not hold all of the tiny drops. Many of them go together and make larger drops. We can see these new drops, but they are so small that they float in the air, and we call them steam. The air is cold far up in the sky, and the tiny drops of water have come together to make a kind of cold steam which appears as clouds to us.”

“Now, I understand what makes the clouds,” said Marylee. “But I would like to know what makes the water come down in big drops.”

“I think that I can help you to understand that, too,” answered Uncle Jack. “The clouds of cold steam float in the sky until they come to a place where the air is much colder. Then the little drops get still closer together until they form drops so large that they will no longer float in the air. So they fall to the earth. If we are under that cold place in the sky, the drops fall on us.”

“Have you ever been up in a cloud, Uncle Jack?” asked Buddy.

“Yes, I have been in clouds many times,” answered Uncle Jack.

“Please tell us what they looked like,” begged Marylee.

“They looked like cold steam all around me. I could see the little drops of water floating in the air, and there were so many little drops that I could not see through them. They were gray and wet, but no big drops were falling.”

“Sometimes these clouds are right down on the ground,” continued Uncle Jack. “Then we call them fogs. Fogs are dangerous on the ocean, because men in boats cannot see where to go. They get lost and cannot get back to land until the fog goes away. Sometimes the boats run together and are wrecked.”

OUT IN STAR LAND

*The heavens declare the glory of God;
and the firmament showeth his handiwork.*

THE BIBLE

LIVING ON THE MOON

Buddy, Marylee, and Uncle Jack were sitting on the porch talking with Mother. It was after supper, and the sun had just gone down behind the hills in the west.

“Look, Mother! Look, Uncle Jack! See the great big round moon coming up in the east!” cried Marylee.

“The sun and the moon must be playing seesaw,” said Buddy. “The moon comes up and the sun goes down.”

Mother and Uncle Jack both laughed at the idea of the sun and moon playing seesaw.

“Mother told us last year that the moon was large and round like it is now for just a night or two, and then grows smaller until it is all dark. After that the light part comes back and grows larger each night until the moon is all bright and round again like it is tonight.”

“That is well told, Buddy,” said Uncle Jack. “Do you remember how long it takes the moon to grow small and then get big again?”

“I remember,” said Marylee. “It takes about four weeks.”

“I wish I had an airplane so that I could fly to the moon,” said Buddy. “I wonder what it is like.”

“Airplanes cannot fly to the moon, because the earth keeps pulling them back, just as it pulls you back when

you jump up in the air," said Uncle Jack. "But let's play that you could fly to the moon. How long would it take you to get there?"

"An airplane goes whizzing, Uncle Jack," answered Buddy. "It goes more than a hundred miles an hour. It might take me all day to get there if I didn't stop."

"It is farther than you think it is, Buddy. You would have to fly all day and all night during your whole summer vacation."

"Do you mean I would have to fly the whole three months at a hundred miles an hour, and never stop to eat or sleep?" demanded Buddy. "Whew! That is a long way, Uncle Jack. It gives me a headache to think about it. I believe I would rather stay here and let you tell me about it."

"I think that is the better plan," said Uncle Jack. "It would not be very much fun even after you got there. It would be so hot during the day that you would burn. You would feel as if you were walking on the top of a stove that is nearly red hot. You would fry like a piece of bacon in a frying pan. That is the way you would feel all day, and a day on the moon is two weeks long."

"I can almost feel myself frying now," said Marylee; and they all laughed.

"Then after you were cooked for two weeks, it would get dark," continued Uncle Jack. "You would not even be warm any more. Oh, no! You would get colder and colder. You could put on all of your clothes and still you would be cold. Your nose would freeze. Your fingers and



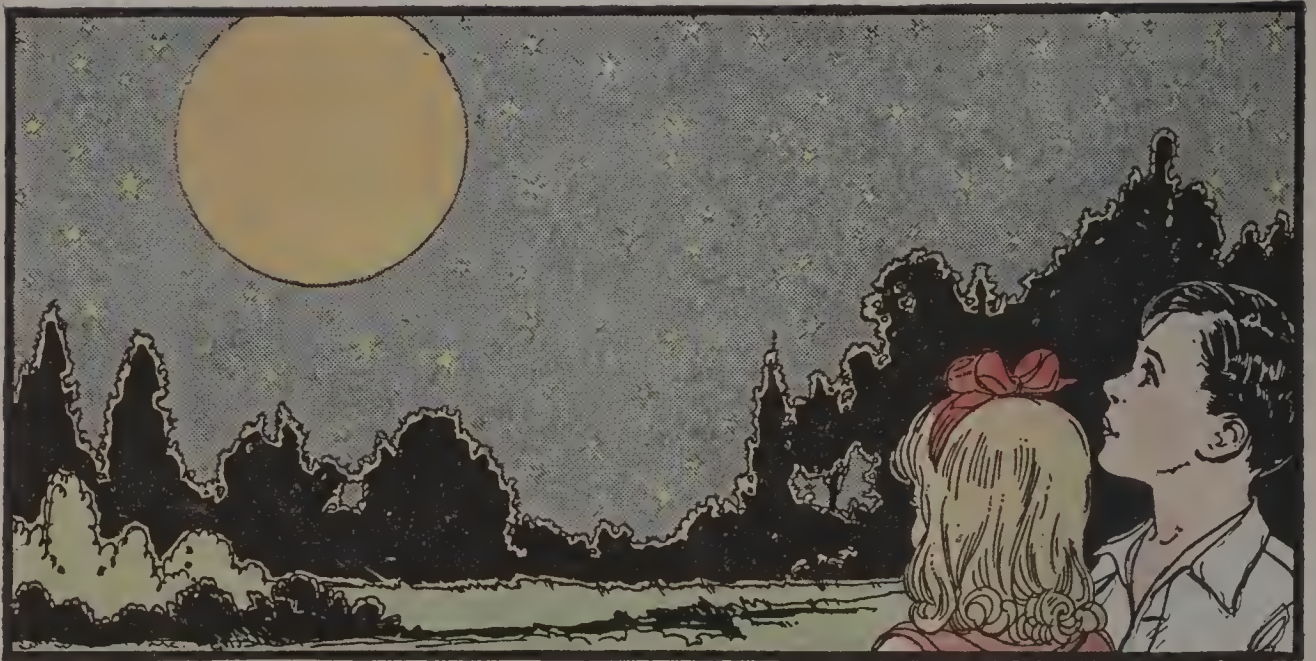
toes would freeze. Then you would begin to freeze all over, and soon you would be like a piece of ice.”

“Now, I am getting all cold,” said Marylee, as she snuggled up close to Mother as if to keep warm.

“These are not all of the queer things about the moon, either,” said Uncle Jack. “There are no trees there. There are no insects, no birds, and no flowers. All of those things must have water to drink and air to breathe, just as you do. But there is no water on the moon and no air. So nothing can live there. The only things to see are the great mountains of solid rock.”

“How does the Man in the Moon live in such a place,” asked Marylee, with a wondering look.

Uncle Jack laughed and said, “I would feel sorry for him if he were a real man. But, of course, people only play that they see the picture of a man in the moon. That is just the way you sometimes watch the clouds



and play that you see pictures in them. But, if you look at the moon through a large telescope it looks much bigger and seems to be much closer. Men have looked at the moon through telescopes for many years and they have learned that the dark places are either shadows made by high mountains or mountains of dark rocks and metals. The light spots are vast plains of light-colored rocks.”

SHOOTING STARS

“Money! Money! Money! Money! Money!” shouted Marylee, as she jumped up from the chair where she was sitting on the front porch after dark.

“Now what has happened?” asked Uncle Jack, as he looked at Marylee. “Did you see a lot of money?”

Mother laughed and said, “Don’t you remember, Jack, when we were children, how we used to say, money, money, when we saw a shooting star?”

“Oh, yes, I remember now,” answered he. “We thought the more times we could say money while it was in sight, the more money we would have some time.”

“Why do the stars fall?” asked Buddy. “Aren’t they fastened well enough in the sky?”

“Those shooting lights are not really stars,” answered Uncle Jack. “The stars that you see twinkling up in the sky never fall. They are many times farther away than the moon. Each one is many, many times larger than our whole earth.”

“What are those falling lights we see, then?” asked Buddy.

“They are called meteors,” answered Uncle Jack. “Some of them are as large as our house. Some are larger, most of them are smaller. They are much like a big rock. But they are not bright. So you cannot see

them, flying through the sky, until they come close to our earth."

"Why do they get bright near the earth?" asked Buddy.

"When the meteor gets close enough to the earth to hit the air, it is going so fast, it at once gets hot and starts to burn," explained Uncle Jack; "for the air is like a great blanket around the earth. It extends only a short distance up in the sky."

"I don't understand why the meteor gets so hot when it hits the air," said Buddy.

"I don't think that I can explain that to you in words you can understand," said Uncle Jack.

"Please do and we will try hard to understand, Uncle Jack," begged Marylee.

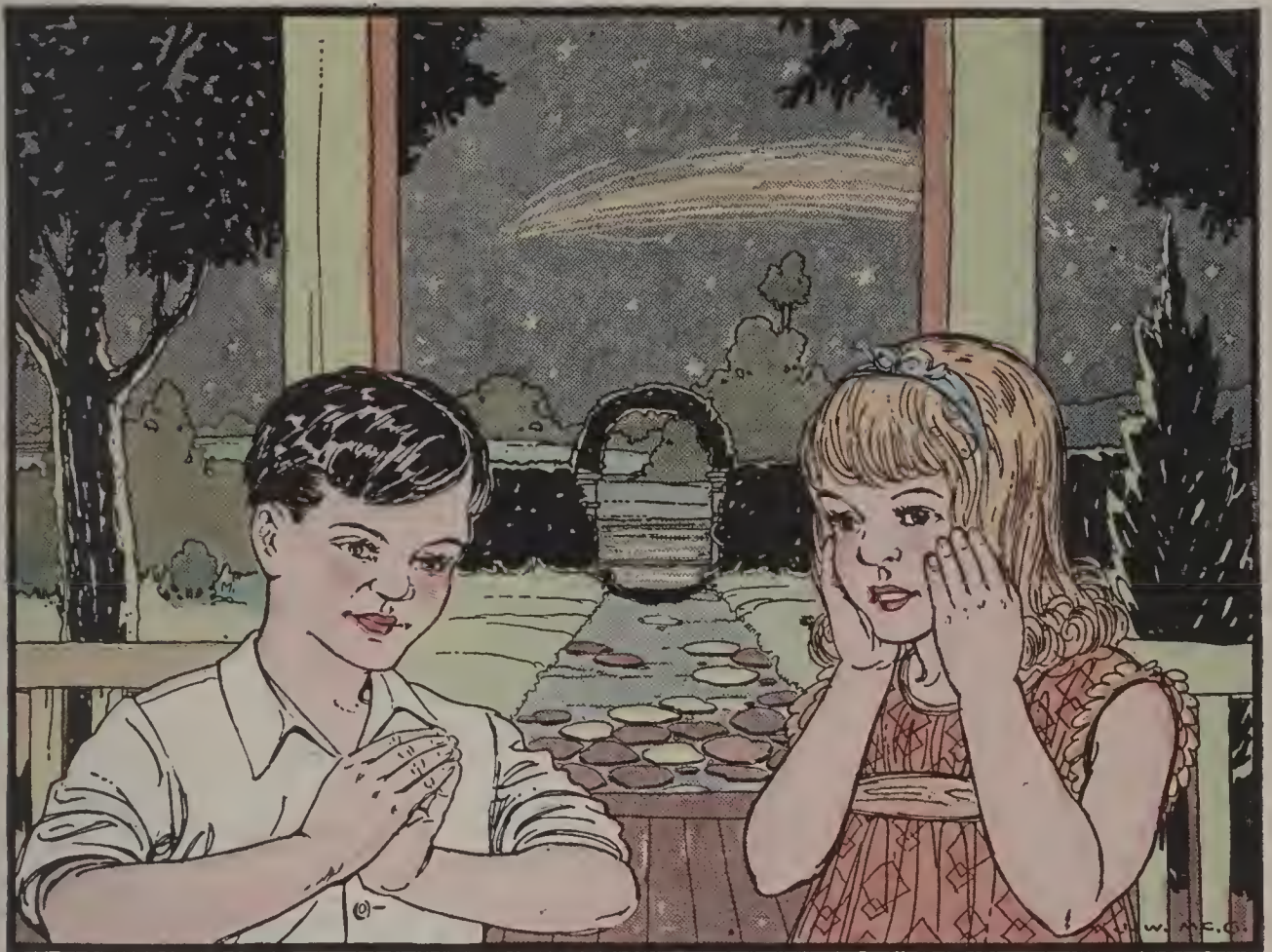
"I shall do the best I can, then," said he. "First, open your hands and rub them together just as fast as you can. Faster! faster! Now hold them against your face."

"Oh, that makes our hands hot!" said Marylee.

"Yes. Things always get hot when you rub them. The faster you rub them the hotter they get. They will begin to smoke and then to burn if you rub them fast enough. The Indians used to make fire before they had matches by rubbing two pieces of wood together. Anything going through the air fast enough will get hot, because it rubs against the air."

"Does the meteor get hot because it rubs the air?" asked Buddy.

"Yes," answered Uncle Jack. "It goes through the air



very, very fast and gets hotter and hotter until it begins to burn. Then you can see it.”

“But you said the meteor was a kind of rock,” said Buddy. “Rocks won’t burn, will they?”

“Yes, anything will burn if it gets hot enough,” said Uncle Jack. “These rock meteors usually burn up before they get to the earth. Sometimes they do hit the earth, and go far into the ground. Men have dug them out. That is how we know what they are made of.”

FINDING THE NORTH STAR

“Aren’t the stars bright tonight?” said Buddy, as he, his sister, and his uncle came out on the porch one evening. “Uncle Jack, is it as far to the stars as it is to the moon?”

“Mother said it was much farther to the stars, Buddy,” replied Marylee.

“It is much farther,” said Uncle Jack. “If you could fly so fast that you could go from here to the moon while I say zip, zip, it would take you four years to get to the nearest star you see.”

“How far away that must be!” exclaimed Marylee. “Let’s play we are going to a star. Zip, zip. We are at the moon. Zip, zip, and we are twice as far as the moon. Zip, zip, and we are three times as far. Then if we keep going like that all day, and all night, and all week, and all month, and all year, for four years, we would get to the first star. My! That’s a mighty long way!”

“Are the stars like the moon, Uncle Jack?” asked Buddy. “The moon is sometimes boiling hot and sometimes freezing cold, you told us.”

“No, the stars that we can see are never cold,” replied Uncle Jack. “They are great balls of burning rock and gases. They are hotter than anything that we know.”

“Buddy, do you see those bright stars over in the



north?” asked Marylee. “I mean those seven stars that are so pretty.”

“I think I do,” replied Buddy. “Do you mean the ones that make a picture something like a big cup with a long handle? Three of the stars are in a line like a handle, and the other four stars make the cup.”

“A cup with a long handle like that is called a dipper,” said Uncle Jack. “So we call those stars the Big Dipper. You can always find the North Star if you can see the Big Dipper.”

“Why is it called the North Star, Uncle Jack?” asked Marylee.

“The North Star is always in the north. All other stars seem to move, but this star does not. You can always know which way you are going at night if you can see the North Star. It is always in the same place in the sky. Of course, you know that the sun does not really move through the sky. Neither do the stars. It is the earth turning around that makes them seem to be moving.”

“Yes, Mother told us about that,” said Buddy.

“The Big Dipper does not stay all night where it is now,” continued Uncle Jack. “It will be up higher in the sky after a while, just as the moon will be higher. But the North Star will be in just the same place as it is now.”

“How can we tell which is the North Star?” asked Marylee.

“Do you see those two stars which make the side of the Dipper that is away from the handle?” asked Uncle Jack.

“Yes, I see them,” answered Buddy.

“Those two stars always point to the North Star. So they are called the Pointers. I have a piece of string here. Take hold of each end and pull it so that it will be straight.”

Buddy took an end of the string in each hand and pulled it as his uncle told him.

“Now keep the string straight, but hold your hands out in front of you and up towards the Big Dipper. Hold one end of the string right on the Pointer star that is

at the bottom of the cup. Now move the other hand so that the other Pointer star is touching the string. Look along the string toward the hand that is away from the Dipper. The first bright star you see almost touching the string is the North Star."

"I see it!" cried Buddy. "I can find the North Star now."

"Let me have the string to see if I can find it, too," said Marylee. She took the string and held it the way her brother did, and soon she found the North Star.

"You must remember that it does not make any difference where the Big Dipper is when you see it," said Uncle Jack. "It seems to move, but those two Pointers are always pointing to the North Star."

"Do all the other stars have names, too?" asked Marylee.

"Yes, many of them do," replied Uncle Jack. "Very interesting stories have been written about a great many of them. Some of the stories are very exciting. I may tell you some of them another time."

I N D E X

- A
- Acorn, 162
 Adult, 12
 Air, 25, 192, 202
 Ants, 13-16, 66
 Parasol, 13-19
 Armadillo, 101-104
- B
- Bank Swallow, 130
 Bat, 116-119
 Bees, 158-160
 Beetle, 98, 104, 142, 146
 Beets, Sugar, 176, 177
 Belted Kingfisher, 123-126
 Big Dipper, 205-207
 Bill, 123, 124, 126, 128, 132, 142
 Birds
 See
 Bank Swallow, Belted Kingfisher, Bluebird, Butcher bird, Cardinal, Cliff Swallow, Flicker, Geese, Mocking bird, Pigeon, Scissor-tailed Flycatcher, Shrike, Turtledove, Woodpecker, Verdin
 Black Widow Spider, 69-71
 Bluebird, 131-135
 Box Tortoise, 80-83
 Bricks, 184
 Bullfrog, 53-57
 Burs, 169-170
 Butcher bird, 141-143
 Buttercup, 159-160
 Butterflies, 38, 71, 165
 Monarch, 38-41
 Viceroy, 40
- C
- Cane, sugar, 176, 177
 Cardinal, 128
 Caterpillar, 29, 30, 34, 36, 134
 Cecropia, 34, 35, 179
 Hawk, 30-33
 Humming-bird, 30-33
 Monarch, 41
 Silk, 179
 Swallow-tail, 32
 Catfish, 49, 52
 Cecropia Moth, 34-37, 179
 Claws, 102, 106, 107, 116
 Clay, 183-186
 Cliff Swallow, 127-130
 Clouds, 190-192
 Cocklebur, 169-170
 Cocoon
 Cecropia, 36, 37, 179
 Hawk, 33
 Humming-bird, 33
 Monarch, 41
 Silk, 179
 Collared Lizard, 84-87
 Cottonwood, 170
 Crawfish, 45-48, 72
 Cricket, 20-22
 Crop, 139
- D
- Daddy Longlegs, 71
 Dandelion, 170
 Devil's Darning Needle, 23
 Dipper, Big, 205-207
 Dirt, 183
 Dobson Fly, 26-28
 Dove, Turtle, 136-140
 Dragon Fly, 23-25
- E
- Earth, 183, 203
 Earthworm, 30, 78, 101, 102, 104

Egg

- Ant, 16, 18
- Black Widow Spider, 70
- Box Tortoise, 101
- Dobson Fly, 28
- Dragon Fly, 24
- Fish, 50-52
- Frog, 54, 55
- Monarch Butterfly, 40
- Mosquito, 60
- Moth, 32
- Scissor-tailed Flycatcher, 146
- Wasp, 10

F

- Feelers, 47
- Feet, 128
- Feldspar, 184, 186
- Fish, 124, 139, 187, 188
 - Sun, 49-52
- Flicker, 66
- Flour, Rock, 184
- Flowers, 157-161
- Fly, 23
 - Dobson, 26-28
 - Dragon, 23-25
- Flycatcher, Scissor-tailed, 144-148
- Flying Mammal, 118
- Fog, 193
- Fossil, 188-189
- Frog, 78
 - Bull, 53-57
- Fungus, 15, 18

G

- Garter Snake, 76-79
- Geese, 152-154
- Gila Monster, 87
- Gopher, Pocket, 105-108, 113
 - Striped, 113-115
- Grasshopper, 65, 66, 71, 104, 134, 141, 142, 146
- Grass seeds, 139

H

- Harvest Mouse, 109-112, 115
- Hawk, 147, 148
- Hawk Moth, 29-33
- Honey, 67, 158
- Humming-bird Moth, 29-33

I

- Insect, 25, 71, 78, 92, 98, 101, 102, 127, 134, 138, 139, 142, 188
- See also:
 - Ants, Bees, Beetle, Butterflies, Cecropia Moth, Cricket, Daddy Longlegs, Dobson Fly, Dragon Fly, Grasshopper, Hawk Moth or Hummingbird Moth, Monarch Butterfly, Mosquito, Parasol Ants, Viceroy Butterfly

K

- Kingfisher, Belted, 123-126

L

- Larva, 12
- Live oak, 161-164
- Lizard, Collared, 84-87

M

- Mammal, 117-118
 - Flying, 118
- Meteors, 201-203
- Milk, 139, 170
 - Pigeon, 139
- Milkweed, 40
- Mocking bird, 128, 141
- Monarch Butterfly, 38-41
- Monster, Gila, 87
- Moon, 197-200, 204
- Mosquito, 23, 58-62, 117
- Moss, 15
- Moth, 117, 144
 - Cecropia, 34-37, 179
 - Hawk, 29-33
 - Humming-bird, 29-33
- Mouse, Harvest, 109-112, 115
- Mud, 128, 130, 188
- Mulberry Tree, 179

N

- Nectar, 158-160
- Nest
 - Bank Swallow, 130
 - Bluebird, 132
 - Cliff Swallow, 128, 130
 - Dove, Turtle, 138
 - Harvest Mouse, 109, 110
 - Kingfisher, 126

- Parasol Ants, 13-19
 Scissor-tailed Flycatcher, 146
 Verdin, 149, 150
 Wasp, 7-11
 Nettles, 165-168
 North Star, 205-207
 O
 Oak, Live, 161-164
 Ocean, 175, 187, 188, 193
 Oil, 62
 Opossum, 91-96
 P
 Parasol Ants, 13-19
 Pigeon, 139
 Milk, 139
 Pincers, 26, 45, 46, 47, 72, 74
 Pocket Gopher, 105-108, 113
 Pointers, 206, 207
 Pollen, 158, 159
 Potato, 172-174
 Poverty Weed, 147
 Pupa, 12, 32, 33, 37, 41
 Q
 Queen Ants, 17, 18
 R
 Rain, 190
 Rattlesnake, 70
 Rayon, 178-180
 Rings, 163, 164
 Rocks, 184, 186-188, 201, 203
 Rock Flour, 184
 S
 Sac, 74, 166
 Salt, 175, 176
 Sap, 168, 170, 175, 176
 Seeds, 139, 158, 169-171
 Scissor-tailed Flycatcher, 144-148
 Scorpion, 72-75
 Shooting Star, 201
 Shrike, 141
 Silk, 36, 178, 179, 180
 Silkworm, 179
 Skunk, 97-100
 Smart Weed, 166, 167
 Snails, 187, 188
 Snake, 76, 79, 131
 Garter, 76-79
 Rattle, 70
 Snapping Turtle, 1, 81
 Soil, 183
 Spider, 65-68, 72
 Black Widow, 69-71
 Web, 35, 150
 Star, 204
 North, 205-207
 Shooting, 201
 Steam, 191-192
 Stick-tight, 170
 Striped Gopher, 113-115
 Spermophile, 113
 Sugar, 175-177
 Beet, 176, 177
 Cane, 175, 176
 Sunfish, 49-52
 Swallow
 Bank, 130
 Cliff, 127-130
 Swimmerets, 46
 T
 Tadpole, 53-57
 Teeth, 77, 83, 86, 93, 102, 107, 116,
 117
 Terrapin, 81
 Tortoise, Box, 80-83, 101
 Tree, 188
 Live Oak, 161-164
 Mulberry, 179
 Tubercles, 34
 Turtle, Snapping, 1, 80, 81
 Turtledove, 136-140
 V
 Verdin, 149-151
 Viceroy Butterfly, 40
 W
 Wasps, 7-12, 71, 165
 Water, 190
 Web, 35, 69, 150
 Weeds, 146, 165-167
 Weed, Poverty, 147
 Seeds, 139
 Smart, 166, 167
 Wiggle-tail, 58-62
 Worm, Silk, 179
 Wood, 163, 178, 180
 Woodpecker, 132

